THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CVII. No. 2415.] LONDON, AUGUST 24, 1909. [61ST YEAR. PRICE 6d.

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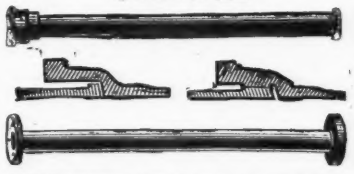

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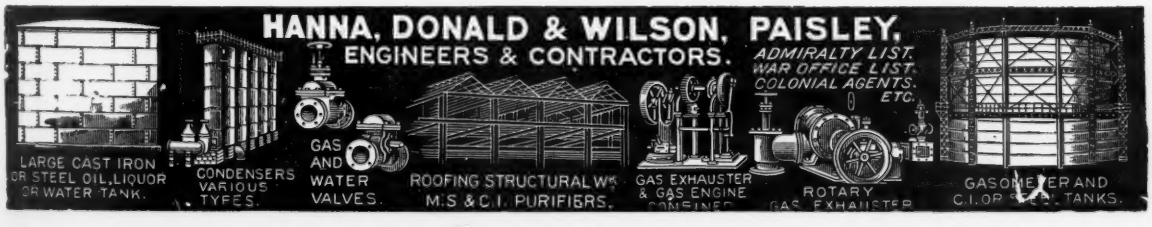

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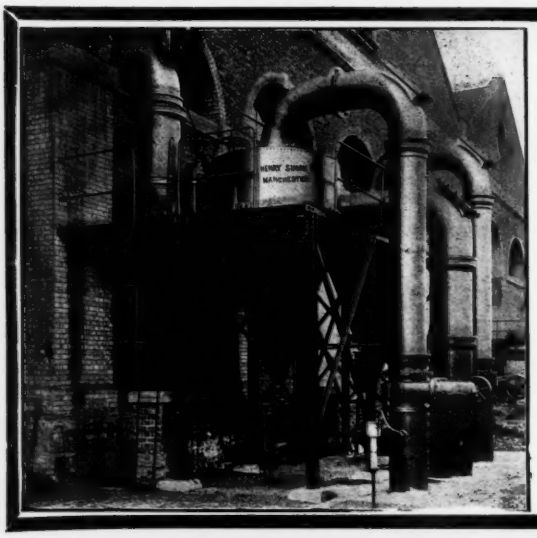

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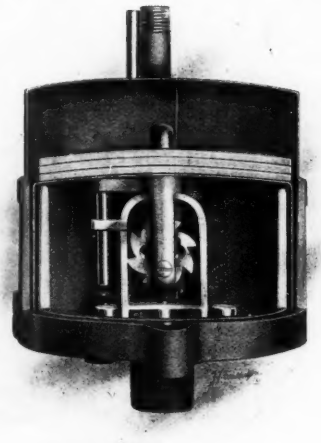

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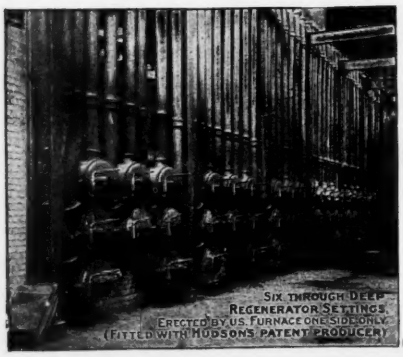

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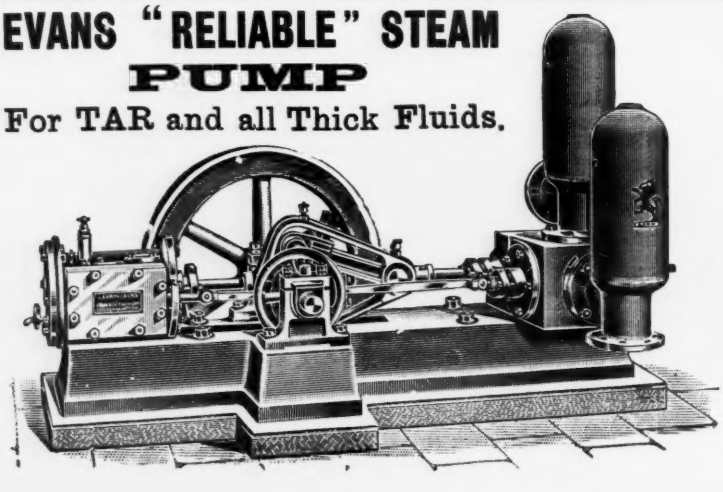

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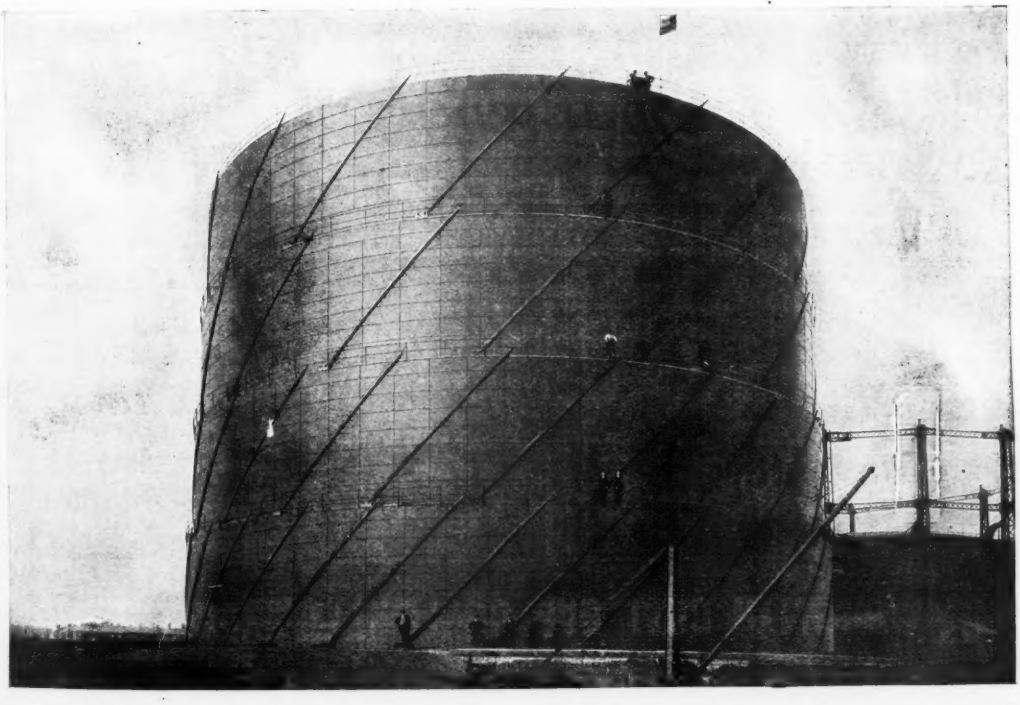

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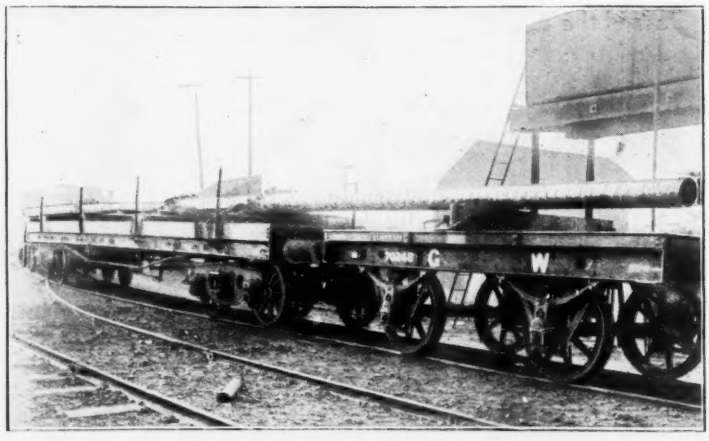

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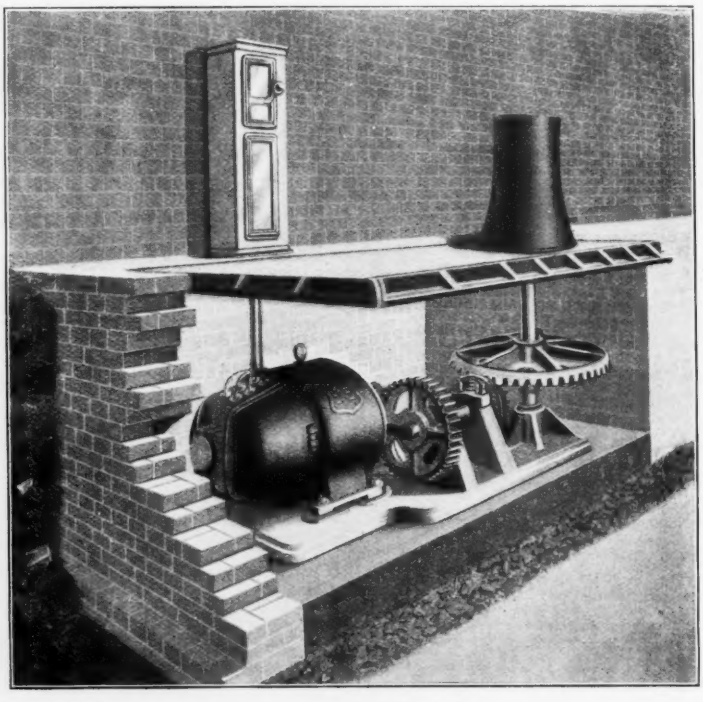

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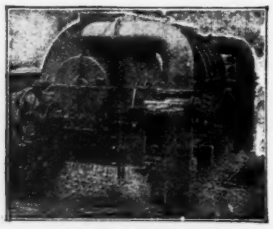

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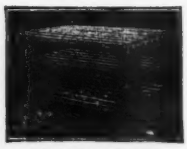

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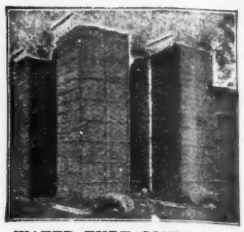

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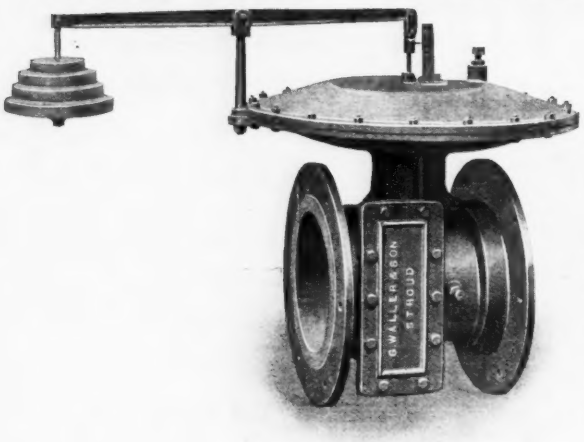

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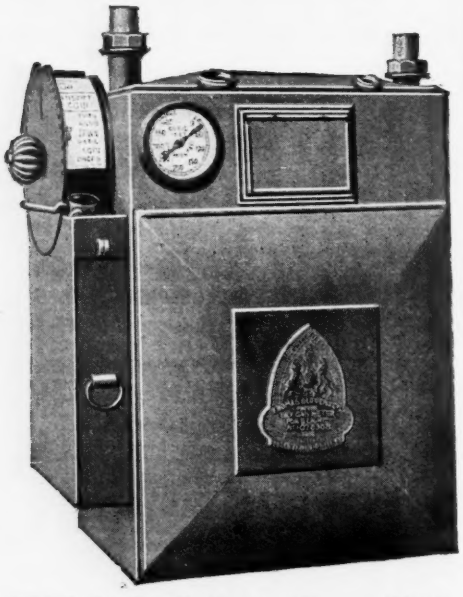

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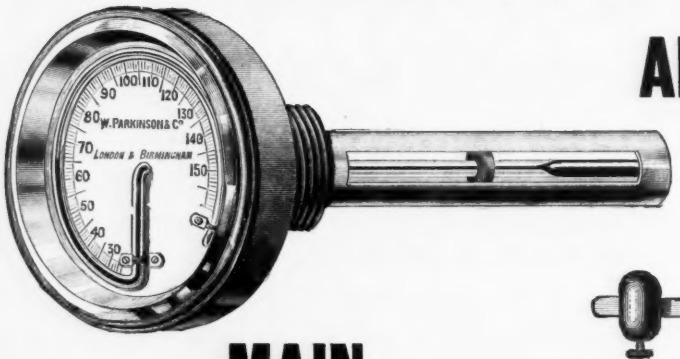

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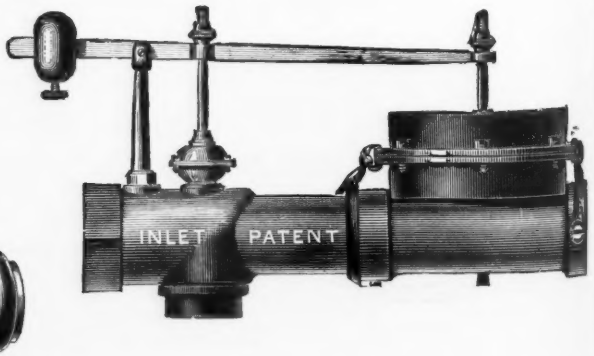

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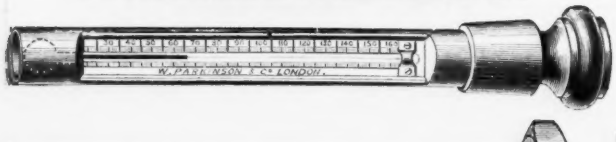

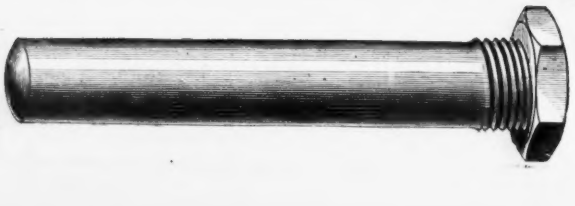

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EDITORIAL NOTES—GAS, &c.

Gas Workers and Unemployment Insurance.

THE development of the Government scheme for insurance against unemployment is a matter that will be closely watched by the gas industry—an industry providing such extensive and regular employment for labour—both on account of the additional financial liability that it promises to impose, and the additional work that it will entail. In framing a scheme like the one now under notice, consideration should be given to the conditions of employment, as to whether it is permanent or otherwise. The workers of the gas industry, except the small proportion—and it is a diminishing proportion—who are taken on during the winter season, when work generally is at its lowest point, can count upon their employment being continuous, so long as their conduct and interest in their work are good. They have no reason whatever for insuring themselves against unemployment; and if they were given the option of doing this, the majority would certainly, we venture to think, decline to insure. Much less ought such employers as gas undertakings—company or municipal—to be forced to take upon their shoulders, other than perhaps for their winter hands for the time they are in their employ, the additional obligations the Government are proposing to put on them. To illustrate the point, the South Metropolitan Gas Company in their accounts set out half yearly the total sum paid in wages. Last half year, £256,760 was distributed among the workmen; and of this £51,109 is the amount paid as carbonizing wages. It is only, generally speaking, in the class of labour represented in the latter sum that there is now any fluctuation between winter and summer employment; and the extra work is given in the winter when the pinch of unemployment is most severely felt. We entirely fail to see why it should be made obligatory upon employers who provide work in this way, in greater part free from the hazards by which other classes of employment are obsessed, to contribute to the insurance of men whose only chance of being deprived of their employment is misconduct or incompetence. It appears to us to be an anomalous position to insure against unemployment, when good behaviour is the only premium asked to ensure constant employment. Besides well paid and permanent employment, the gas worker is hedged about with consideration on the part of his employers, all of which costs money; and, in full measure, is this so in the case of the co-partnership companies. Of course, the anticipated answer to this will be that the well-favoured industries must be made, in these days of social reform, to assist in bearing the burdens of those that are less favoured. But let it not be forgotten that the gas industry affords less scope, through the character of its business, for mechanical operation than most other industries.

The scheme of the Government has not assumed definite shape yet; but Mr. Winston Churchill, the President of the Board of Trade, since he introduced the matter to the House of Commons, has imparted through another channel information as to the lines the project will take. It is proposed that it shall be compulsory and contributory, and be divided up into different sections for different trades. Contributions are to be from men, masters, and the State. The amount of contribution is not yet fixed. But it will be something like 2½d. per week per man from each of the three sources of income—that is to say, insurance against unemployment will mean an average cost for each worker, whether in permanent work or merely temporary employ, of 7½d. per week. The estimate of the amount the State will have to contribute (which amount will also largely come from the taxation of industry) will be £1,500,000; so that it would seem the total annual cost of the project is computed at about, or not far short of, £4,500,000. There is something more than this direct cost. The expense of collection it is proposed shall fall upon the employers. From each worker's wages the employer, it is contemplated, shall deduct 2½d. a week, and to make contribution of a like amount—attaching stamps to the value of 5d. upon the worker's card, or else send, with a cheque for the total sum due, the bundle of cards for stamping to the nearest labour exchange, through which employment will be found for men thrown out of work, or for a period a weekly out-of-work allowance will be paid. The burdens and the unproductive expenditure of industry are growing. The proposed fresh burden is easily calculable. Take the case of a gas undertaking employing 500 hands, it means a direct expense of £270 16s. 8d. a year; or supposing the Gaslight and Coke Company were employing, to take a round figure, 10,000 men when the scheme comes into operation, it would mean an annual charge of no less than £5416, without the cost of the weekly work entailed. It is not intended, in the first instance, to apply the scheme to all industries. The seasonal and cyclical fluctuations of labour have been inquired into; and it is proposed to apply the project at the outset to industries that are found to be most severely affected—such as building, shipbuilding, engineering, construction works generally, and vehicle making. It is not clear whether the gas industry will be brought into any one of these classes; it is just possible it may be partly, if not wholly.

The scheme is excellent enough in its intentions; but it seems, on first examination, as though it is going to be a costly method of effecting but a moderate amount of good. Among the advantages, it is believed by the principal creator of the scheme that assurance against evil days will assist in causing the worker to pay less heed to the promises of revolutionary Socialism. But what does "revolutionary "Socialism," as represented by Mr. Will Thorne, say to the project? He asserts that wages are already too low, compared with the growth of the national wealth, and that the entire cost of the insurance scheme—like old-age pensions—should be borne by the State. Mr. Thorne announces his intention of advising the members of the Gasworkers' Union to resist any attempt at compulsory deduction from their wages. It is further believed by Mr. Churchill that the scheme will create a common interest between employers and employed. Compulsion has never effected that; but a voluntary co-partnership has. Certain trade unions who provide out-of-work pay are not at all pleased with the scheme, believing that it will do something to undermine their position, power, and utility.

The Old Restriction.

GAS supply being a *quasi*-public service, there seems to be a fitness in supposing that the public take some interest in the qualitative evaluation of the popular commodity. But as a matter of fact, the public does not do any such thing; and what is more does not care a jot for, or trouble its head over, the question. Its knowledge and views on the subject are embraced within the ample covering expressions "bad" or "good"—just as it happens that their fittings are in, or are not in, condition and order to render the most efficient service by the use of the gas supplied. There has recently been an article in "The Times" by Professor Frank Clowes (*ante*, p. 366) and a letter by Mr. G. M. Gill, on the subject of "A Calorific Test for Coal Gas" (p. 524). It is not thought for a moment that the portion of the public who are readers of "The Times," and are not interested in gas supply in any other capacity than that of consumers, have paused to read anything more than the headings to the communications on the subject in our morning contemporary. But the article and letter may have caught the eyes of sundry of our legislators; and if they have done so, they have no doubt helped to pave the way to the dismissal of a standard and test of quality that are to-day incongruous with the use of the commodity.

Mr. Gill speaks of the desirability of freedom from all restrictions for a supply subject to such competition as gas is from electricity. This question of absolute freedom was

dealt with in these columns only last week; and there is nothing to add to what was then said. Then he proceeds to make a point (which has been a matter of complaint in our columns for years past) as to the injustice that exists between gas and electricity supplies, in that the latter is not subject to standards, penalties, and supervision in the same manner that gas is, but has complete liberty—perhaps too much liberty for the good of the ratepayers in areas where the electricity undertaking is a municipal concern—in the conduct of the business. It is, however, submitted by Mr. Gill that "there would not be so great an objection to standards "and penalties on the part of gas-supply companies were "electrical undertakings placed in a similar position." This is true in a degree; but only in a degree. The fact that electricity suppliers were subjected to standards and penalties would not remove the objections—and they are well-founded objections—in the gas industry to standards and penalties, and to the elaborate supervision that savours of gas undertakings being all suspect.

While opposed to dual standards and testings for gas, recognition is made in the letter of the strong feeling that gas engineers entertain regarding the illuminating power standard being abolished in favour of a calorific power one. It is interesting in this connection to learn that, "so long as "there are tests with which compliance must be made, gas "companies will endeavour to advise Parliament by intro-"ducing into their Bills whatever alterations they deem "necessary in the interests of the public." Reading this in conjunction with the "strong feeling" that exists among gas engineers, there ought to be a shoal of gas measures in Parliament shortly asking for the abolition of the illuminating power standard, with or without a calorific power standard in substitution, just as the gas companies "deem neces-"sary in the interests of the public." We are afraid that a long experience of Parliament in relation to gas matters has not hardened belief in our law-makers readily accepting advice that Gas Companies embody in their Bills affecting the general principles of control in gas supply. Our legislators seek at the back of these things for self-interest, as well as for the public weal; and they seem to think they find that for which they search, and so the way to reform is both difficult and long. However, it is good to take every opportunity for informing as to the true position those who, though without technical knowledge, have influence in these matters. In this instance, their increased information regarding the injustice, antiquity, and inappropriateness that are wrapped about the illuminating power standard for gas may help to hasten redress by the removal of the old encumbrance, though it may not be without the institution of a fresh standard, but one that will be in accord with the modern trend of both gas manufacture and application.

The Inverted Burner.

With the exception of the classical researches of Professor Drehschmidt, the inverted incandescent gas-burner has not undergone that extended investigation that it might have been supposed its merits would have commanded; and though the inverted burner in itself is a small thing, and comparatively simple in the structure which returns to the user a high efficiency if he will only give attention to one or two modest requirements, its advance to the present degree of perfection has come about in very piecemeal fashion and by a very long road. Mr. Henry O'Connor, in his lecture to the Irish Association, has done good service in summing up the essentials for a good inverted gas-burner, and the conditions of use. His lecture does not enlarge the store of information; but it concentrates many useful points, from some of which it would not be a bad thing if Mr. O'Connor would pursue investigations, and supplement what he has now said.

The blunt assertion with which the lecturer commences jars upon one a bit: "That this [the inverted burner] is the "reverse of scientific, will be gainsaid by no one." We should have preferred that Mr. O'Connor had not employed the word "scientific," but had used the expression "natural," in view of, as explained a few lines after, the reversal of the laws of Nature by the flame burning downwards. It is not due to the inverted burner that it should be in any way degraded by the epithet unscientific; inasmuch as it is through the application of science to an unnatural condition of things that has brought to us one of the best and most economical of lighting appliances, which has gained rapid popularity in the houses of rich and poor alike, in shops, and in the streets. But though Mr. O'Connor approaches his task by setting the inverted burner beyond the pale of scientific title, he re-establishes it in estimation by his free acknowledgment that it is the best lighting instrument that gas has, in that it gives the highest illuminating efficiency of any burner, as it dispenses at least 76 per cent. of its light below the horizontal. It is anomalous that there should be any justifying ground whatever for describing an article of utility as being unscientific when it is the most efficient instrument for the purpose of ordinary artificial illumination. But there is the fact; and there is complete contentment with this useful, unorthodox appliance of the gas industry.

Many matters are treated upon in the lecture. Perhaps most interest is found in Mr. O'Connor's exercises regarding the theoretical quantity of air required to ensure complete combustion with coal or water gas of the compositions that he names. He finds that 4·9 cubic feet of air are needed for each cubic foot of coal gas of the composition described; and 3·13 cubic feet of air per cubic foot of carburetted water gas, also of quoted composition. Now this is one point upon which Mr. O'Connor might very profitably devote himself to further inquiry. And that is as to the relationship between his theoretical figures and the proportion of air admitted into the mixing-tubes of both upright and inverted burners to attain from the burners and a given composition of gas the highest efficiency. It is well known that the inverted burner per cubic foot of gas requires less air to attain maximum efficiency than the upright burner. Dr. Bunte has devoted inquiry to this matter. For the moment it is not within recollection whether he stated the composition of the gas. However, he found with the gas he employed that three volumes of air were required to enter the mixing-tube of the upright incandescent burner to one volume of gas; but in the inverted burner only two volumes of air were required to one volume of gas. Notwithstanding that in the inverted burner the requisite admission of air recedes materially from the theoretical proportion necessary for complete combustion, the efficiency of the burner is greater than the upright burner, in which air admission more closely approximates the theoretical quantity. The point is an interesting one, and well worthy further investigation. Another point that has relation to this is the vitiation of the primary air supply by the products of combustion, and the consequent loss of efficiency. The sooner the makers of certain burners on the market realize how much inattention to the diversion of the products of combustion tends to disparage their burners, the better will it be for their future; for the deadening effect of the products of combustion on the temperature of the flame is so widely recognized now that—at any rate, the large—buyers will see to it that proper protection of the primary air supply is provided in the burners they purchase.

While on this point, reminder is given that belief and scientific propriety are constantly being shocked, just as the highest results from practical conditions are sometimes secured by the abuse of theoretical considerations. While most of us not only believe but know, that the nitrogen, carbon dioxide, and water vapour of the products of combustion, when allowed to deteriorate the primary air, have a lowering effect on the temperature of the flame, a new gas-lamp was introduced to notice the other day in which there is a cluster of duplex burners—inverted below and vertical above. The makers of this lamp declare that, by collecting the products of combustion from the inverted burners, and passing these products (with a small addition of gas) into the vertical burners above, they are able to secure the incandescence of the mantles, and with considerable economy. The explanation given by the photometrists who have investigated these claims is insufficient to satisfy the sceptic, when the character of the principal products of combustion is considered. To talk of just sufficient gas being passed in to revivify the products of combustion flowing to the vertical burners, is a plausible way of putting the matter to the layman; but while the fresh gas is supposed to revivify the products, what corrupting and, on combustion, temperature reducing, effects have these products upon the coal gas? If, too, the claims have real foundation, then why trouble over the percentage of nitrogen and carbon dioxide contained in ordinary gas? However, if the assertions of the makers of the lamp in question can be substantiated by other tests, there is an interesting problem here for consideration and explanation. But admittedly elementary considerations leave us for the present among the sceptics. The mention of this matter merely arises out of the lecture by Mr. O'Connor, in which there is much information useful to those who have not made a close study of the inverted gas-burner.

Value of Road Tar-Dressing.

THE experience of the South Metropolitan Gas Company mentioned by the Chairman (Mr. Charles Carpenter) at the recent meeting, that greater quantities of tar are now being absorbed for dustless road-making, is that of most other gas undertakings in the country. It is a case though of being thankful for small mercies—thankful for anything coming along that will assist in diminishing supplies. We hear of county councils tar-painting large tracts of main roads, of experiments being ubiquitous, of various authorities giving the borough engineers and surveyors instructions to tar-paint extensively—such as the Middlesex County Council all the main county roads, and the Fulham Borough Council the whole of their macadamized roads; but the supply of tar (through increasing coal carbonization, and the adoption of bye-products recovery plant in connection with coke-ovens), with all this increasing activity and application, does not allow the price of the commodity to rise. Five years ago at this time, the market quotation in our columns was 16s. to 21s., while this week the figures are 16s. to 20s.; and these figures have fluctuated downwards by shillings during the intervening years. It would be venial envy on the part of a gas manager in this country to wish, in regard to tar, that his circumstances were akin to those of Mr. W. Arnott, the Manager of the South African Lighting Association, who was telling us only the other week (*ante*, p. 192) that last summer he sold 60,000 gallons of tar at 6½d. per gallon at the Port Elizabeth works. Sixpence halfpenny per gallon! Several towns in the Colony are experimenting with tar for road purposes; but "there is a difficulty owing to the lack "of tar, for many South African towns have installed elec- "trical undertakings, but have no gas supply." A lack of tar would be a novel experience in this country; and for South Africa it affords yet another argument against the choice of the authorities of many small towns in adopting electricity plant instead of gas-works.

The main thing is that in this country no outlet for the commodity can be despised, though prices are not materially improved. Better to have prices maintained than depreciated. This being the position, there must be gratification at the extension of the use of tar by road authorities, whose technical advisers for the most part are confirmed in their belief that there is nothing like tar for road-surface dressing. But borough engineers, road surveyors, and others having official relationships with the responsible road authorities have, in many directions, found difficulty in persuading their administrative superiors that value is received for the expenditure in this direction; and it would not be at all a bad thing if members of these authorities were supplied with literature on the subject, by those having tar for sale (the same as farmers are with literature by the Sulphate of Ammonia Committee), including the experiences of authorities who are thoroughly convinced as to the tar-dressing of roads being an expenditure that brings in its train both economies and comfort. The Metropolitan Paving Committee appointed by the Metropolitan Borough Councils some time ago have been collecting information on this subject from the technical officers of the local authorities; and several of their views are reproduced elsewhere in this issue. The reports are practically unanimous in testifying to the utility of treating macadam and gravel roads with tar; and it seems pretty clear that, apart from the suppression of the dust nuisance, the employment of tar in the construction of roads and for top-dressing will continue to increase as a valuable economical procedure through the savings that are effected, and as adding, through cleanliness, to the pleasantness of street usage. The reports inform us that road surfaces are preserved; that there is less surface disintegration; that the expenditure on road cleansing, watering, and maintenance is considerably lessened compared with the case of roads not so treated; and that, after rain, the roads dry quickly. This point reminds again of Mr. Arnott's letter. The heavy rains in South Africa, and the wild rushing of the water down the steep streets, formerly did much expensive damage, and caused great inconvenience. This has been changed. Tar-surfacing has proved the preservative against the mischief wrought by the rain floods, which pass over the water-proofed surfaces "without," quoting Mr. Arnott, "causing any damage." If tar-surfacing will resist such violence, how much more will it resist the lighter rainfalls of this country? The fact of the matter is that the application of tar as an agent for the mitigation of a nuisance has proved its economic value to be of such a varied and substantial nature that it is becoming a necessity, and not merely an expedient to a single end in dry weather.

The method of applying the tar, it is seen by the reports, is still a matter over which opinions and practices are unsettled. But, generally speaking, the application of the tar by hand rather than by mechanical spraying has the larger number of adherents; through the tar being better worked in, more evenly distributed, and consequently more durable. There should be a passing warning against the blind worship of too great refinement of method in this matter, as this means additional and not requisite cost. Again turning from London to South African experience, all that is done there is to take tar, cold and crude, direct from the gas-works, spread it by hand, and work it in with rubber squeegees on a well-prepared surface, dusting over afterwards with fine quarry grit; and this treatment stands rough usage to which road surfaces at home are not subject. It will be seen that the cost of tar-surfacing in the London Borough Council areas varies from ½d. to 1½d. per yard super—the difference being partly owing to the variation in the method of treatment, and partly to the fact that the returns manifestly are not uniform in the items constituting the charge. The disadvantages that are mentioned in the returns are few and insignificant compared with the advantages; and any borough engineers who are not over-impressed by a small trial on their own account would do well to compare notes with those fellow professionals who are enthusiastic in praising the virtues of tar as an economy producer by employment for road dressing. The experience, too, is generally opposed to the proprietary or titled dust-preventatives, and in favour of tar. It is found that the former are more costly; that redressing with them has to be done at short intervals; and that they have not the multiple advantages of the gas-works product.

The Restraint of High Illuminating Power.

IN the "JOURNAL" this week, the proceedings at the meeting of the Liverpool Gas Company are reported; and notice is made of the report and accounts of the Sheffield United Gaslight Company. Towards the close of the report of the Sheffield Company, an announcement is made (which, by the way, will be of peculiar interest to our friends at Widnes, seeing that the Sheffield Company have been treading so closely on their heels in the matter of charges) that the sanction of the shareholders is to be obtained to an application to the Board of Trade for a Provisional Order, for, among other purposes, the modification of "the apparatus "for testing the quality of the gas supplied by the Company, "and to reduce the standard for the illuminating power "thereof to 14 candles." In the speech of the Chairman at the meeting of the Liverpool Gas Company (Mr. H. Wade Deacon), are these remarks: "The Board had experienced "considerable difficulty with regard to the supply of cannel. "Owing to the lamentable disaster at the Maypole Colliery, "which supplied them with the bulk of their cannel coal, "their supplies were cut off; and it was for a time hard "to maintain the high standard usually observed." Low-power gas gives liberty; high-power gas and the use of cannel restrict the field from which the supplies of the raw material can be drawn. In the case of the Liverpool Company, in the twelve months ending June 30, the quantity of coal carbonized was 267,663 tons, of which 60,588 tons were cannel (excluding oil); and the cost of coal, oil, &c., showed a decrease of only £1612, in comparison with the preceding twelve months. The Sheffield Company, on the other hand, carbonized 329,159 tons of coal in the twelve months ending June, of which 31,547 tons were cannel; and they saved within a few pounds of £20,000 on their coal bill, in comparison with the preceding year. The Liverpool Company are, in contrast, paying dearly to maintain the "high stan- "dard usually observed;" and the small saving of £1600 suggests that they do not reap such tangible benefit from reduced market prices of coal as those companies who are not bound to a high candle-power gas. When the Sheffield Company obtain the liberty of supplying (instead of under a 16½-candle standard) 14-candle gas (in accordance with the parliamentary model clause), tested by the modern burner approved by Parliament, the Board of Trade, and the Metropolitan Gas Referees, the more favourably will they stand in contrast with the price that the Liverpool Company pay in money and anxiety to bolster up their fetish of a high standard gas. Reports come to hand of towns sending out now about 50 per cent. of their gas in the daytime. Illuminating power is not an essential of that gas. Three-

quarters of the remaining output, it is calculated, is used during the hours of darkness in incandescent gas-burners. Illuminating power is not an essential of the gas used in those burners. Then why are the Liverpool Company still clinging to their "usual high standard," which is unusual elsewhere, and which prevents them making the best advantage of a broad area from which to draw their coal supplies, and a widely open market in which to effect their dealings? In making comparison of the figures, it was disappointing to find that neither the Sheffield nor the Liverpool Companies includes the ordinary statement as to gas made and sold, the absence of which statement eliminates much of the interest that, as a rule, attaches to a technical examination of gas accounts.

Free Maintenance.

Actual personal contact with consumers is the best protection of interests and property that a gas undertaking can have; and one of the best ways in which actual contact can be secured, and continued satisfaction be assured, is by the free maintenance of incandescent burners—consumers merely paying for renewals; gas suppliers undertaking the cleaning and adjustment without charge. Gas companies who have departed from fixed charges to free maintenance have had encouraging experience. The Croydon Gas Company are one of the latest to adopt the system; and they anticipate that a large proportion of their consumers will soon be availing themselves of this service. Apart from the satisfaction that the resulting good lighting affords, the object-lesson is useful that householders have by seeing how the adepts of the gas suppliers perform the occasional work required to maintain, in a high degree of efficiency, the most economical of lights. The feeling engendered among consumers of a direct interest on the part of the gas suppliers, has also excellent effect. This is not sentiment; it is business. It costs money; but it is money well invested. There is no question of showing the white flag about it. It is a means of assuring the forward move of the consumption of gas for lighting purposes, in view of the more economical gas-lamps on the market, and the frantic efforts of competitors to get a larger slice of the lighting business.

Novel Features in Gas-Meters.

Our "Register of Patents" frequently contains notices of new inventions in gas-meters; but mostly they are improvements in established parts for better securing common objects. These, however, show that ingenuity is not by any means exhausted in connection with gas-meter making, nor that the limits of perfection have been attained. Novelty in object is somewhat rare in these days in the means of registering gas consumption; but just lately there have been described and illustrated inventions which have about them what appears, relying only upon memory, to be originality in object and the means of attaining it. There is publication to-day of the outlines of an invention of American origin, standing in the name of Mr. Richard L. Dezendorf, which has for its purpose the provision of means for quickly indicating minute quantities of gas passing through meters. Now an invention of this kind may be claimed to be useful in two distinct ways. It ensures, it is understood, the registration of any consumption, however infinitesimal, and affords a means of quickly detecting leakage. In these days of small-consumption incandescent burners (a 1 foot per hour inverted may be the only burner alight for many hours in a house as a night light or for illumination over a desk), and of bye-pass jets not much bigger than a pin's head going throughout the twenty-four hours, it is a matter of consequence that meters should be equal to more sensitive registration than was formerly demanded of them. It is to be feared that these thread-like draughts of gas are not always accurately accounted for, and so go to swell the item of "unaccounted-for gas." In the detection, too, of leakage either at the time of fitting up a meter, or subsequently in the premises, an ordinary meter is not a prompt indicator; and considerable time may elapse before any record is made on the meter dial. To secure this high degree of accuracy in registration is the purpose of Mr. Dezendorf's invention; and, apart from usefulness, the simplicity of his small attachment, without introducing anything that can be called mechanical complication, is its charm, as can be seen by anyone interested by an examination of a model which we have at the office. The attachment is the only part that we have; and, not being incorporated in a meter, it is impossible to test the assertion that, by the invention the slightest flow produces a perceptible indication instantaneously. A meter of ordinary make supplemented by the means for such sensitive registration would, of course, offer facilities for making prompt determinations of many kinds.

Changing Prepayment Coins.

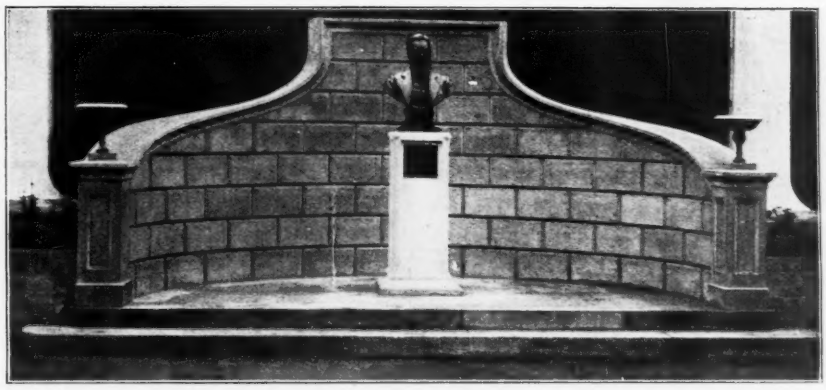
Another invention that was in mind when starting the above note was that of Mr. and Mrs. Stoneham (noticed a fortnight ago) for, in conjunction with prepayment meters, providing means for exchanging coins of low value for coins of higher denomination. The prepayment consumer often wants change; the slot gas-meter is charged with removing much of our bronze coinage from circulation; the collection and disposal of the pence from coin meters absorbs time and is costly; while banks vote the coin business a perfect nuisance. To give relief from these drawbacks, and to provide the prepayment user with the advantage of coin changing on the spot, are the directions in which Mr. and Mrs. Stoneham have been at work. Whether the invention will come into practical service is a matter upon which an opinion cannot be expressed just yet.

Gas-Works Rating.

This perennial subject of dissatisfaction and discomfort for the Directors and engineers of gas undertakings, and in the case of companies for the shareholders, was a chief point in the address of Mr. Alexander Dickson at the recent meeting of the Bromley and Crays Gas Company. The Company have just suffered an increase of their assessment; but not so great as the rating authority's valuer first sought to impose. The strictures to which expression was given by Mr. Dickson, had not so much reference to a reasonable advance of the assessment as to the new-fangled practices of valuers called in by the rating authorities, and the easy manner in which they step from the path that has been trodden for some thirty or forty years in respect of deductions and allowances. Mr. Dickson's opinion is that the matter is so grave that gas companies ought to make it one of common interest and consideration, and see whether something cannot jointly be done to prevent precedents being set at naught and new ideas introduced without judicial authority, and, further, see whether procedure cannot be simplified and systematized. The undesirability of the present condition of things is admitted, as is also the fact that procedure is in a state of remarkable confusion. What Sir George Livesey thought of the position of the rating of gas concerns was stated, in his usual vigorous style, at the meeting of the Gas Companies' Protection Association in October, 1907, on which occasion reference was made to a Committee to see whether a Bill could not be promoted to place the rating of gas-works on a more satisfactory footing. But the Ipswich decision a few months later removed one contentious phase; and thereafter the Association decided not to proceed in the matter then, but to wait and watch. We do not think, in view of all this, that any good would come from Mr. Dickson's suggestion of combined action. When the psychological moment arrives for doing something effective, depend upon it the Gas Companies' Protection Association will not miss it. That time, we fear, will not be until the whole subject of rating revision is under the consideration of Parliament.

Referring to the Livesey Memorial Fund in a recent issue, "Engineering Record" said: "It is gratifying to announce that the fund has been more than fully subscribed. As was mentioned at the time of his death, Sir George Livesey was not only a good engineer, but also a most capable executive. The class of labour employed in gas-works is ordinarily very rough. In the great plants with which he was connected, dissensions arose between the Directors and the men, which resulted in one of the most memorable of strikes in the history of British labour disputes. The settlement of it was an achievement that deserves to be kept in mind. It was not a mere temporary truce, but a readjustment of conditions which went down into the very heart of the trouble. As a result of it, the co-operation of the men and the Directors of the Companies over which Sir George Livesey presided remained complete down to the day of his death. The men became financially interested in the Companies, if they desired, and met the Directors on equal terms. The plan was ridiculed as impracticable for many years after it was put in operation; but it has proved a shining success for a full generation, and an enduring monument to the executive ability and tact of the engineer who introduced it. The Livesey Memorial Fund, which will be used in increasing our knowledge of gas engineering, will also, let us hope, keep alive the memory of this man who did so much to advance the status of engineers in the eyes of the public."

MEMORIAL TO SIR GEORGE LIVESEY.



The Livesey Memorial at the South Suburban Gas-Works, Lower Sydenham.

As an expression of their regard for the memory of Sir George Livesey and of their gratitude for the great benefit he conferred on them by the co-partnership system, the officers and workmen of the South Suburban Gas Company decided to erect a permanent memorial to him in the works, which should act as a continual reminder of their benefactor and friend, and should testify to succeeding generations of employees the high esteem and affection in which he was held by those who knew him.

It was decided that a bust should be placed somewhere near the entrance to the works, so that the men should see it every day as they passed in and out—to and from their employment. A site close to one of the gasholders on the main road through the works was selected; and the designing of the bust and pedestal and of an alcove to contain them was entrusted to Mr. Sydney March, of Glebe Place, Chelsea—a brother of Mr. Edward March, who has painted for the Directors a portrait of Sir George which now hangs in the board-room, and was exhibited in the theatre of the Institution of Mechanical Engineers during the meeting of the Institution of Gas Engineers last June.

The bust is of bronze, and is supported on an elegant stone pedestal, on which is a bronze tablet with the inscription—

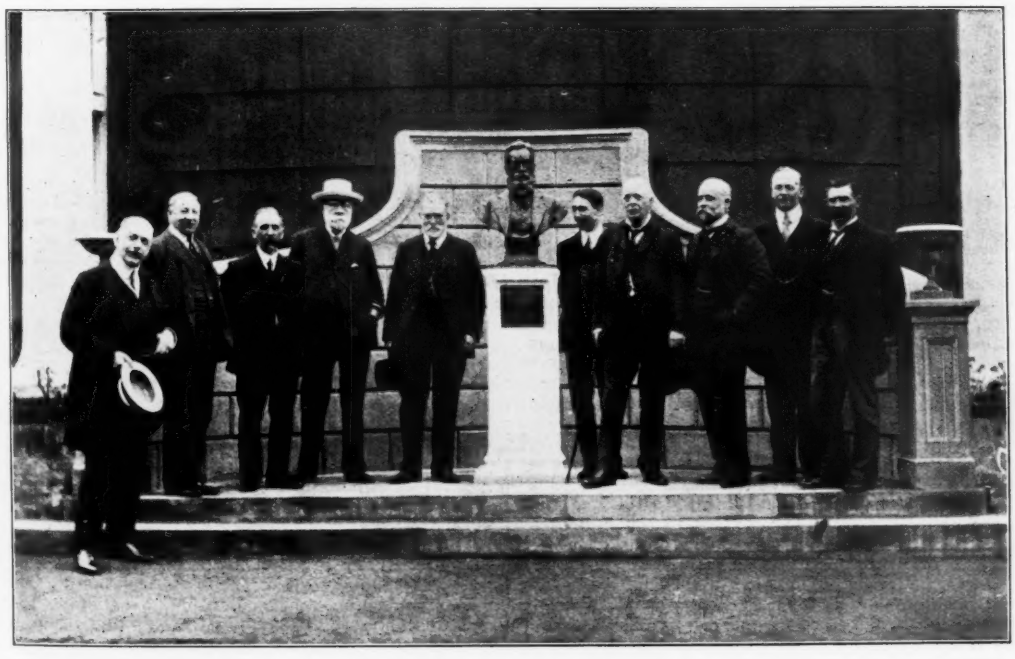
SIR GEORGE LIVESEY,
CHAIRMAN 1894–1908.

On Friday last, the bust was unveiled by the Chairman of the Company, Mr. Charles Hunt, M.Inst.C.E., in the presence of the Directors, officers, and a large number of the workmen.

Mr. WILLIAM WALLER (one of the Workman-Directors and Chairman of the Memorial Committee), in opening the proceedings, said: Gentlemen and Co-Partners,—We are met here this afternoon to unveil the memorial which has been subscribed for by every co-partner in the Company, to show our gratitude and as a mark of respect for him we honour next to our King. There is one other way in which we can show our gratitude to Sir George; and that is by doing our duty to the utmost of our ability, so that other companies may be induced to adopt the co-partnership system. That will be the best possible memorial of the great man of whom we shall be daily reminded, by this bust, as we pass to and from our work. It now rests with us to make our co-partnership a lasting success; and I am sure that we shall do so. We are glad the mantle of Sir George has fallen on the shoulders of one so much after his own heart as our present Chairman, Mr. Hunt; and I will now ask him to unveil the memorial.

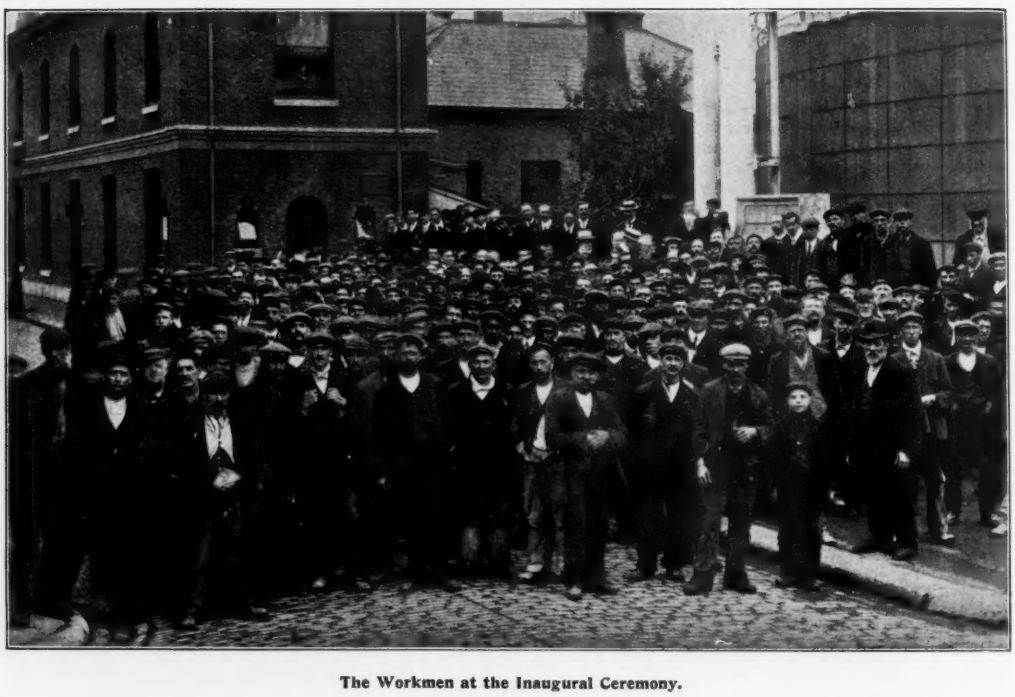
After unveiling the bust,

Mr. HUNT said: Mr. Waller and Co-Partners,—You will, I feel sure, agree that the bust which it has just been my privilege to unveil on your behalf does very great credit to the skill and fidelity of the artist, Mr. March, who, I am glad to see, is with us this morning. It recalls very vividly to our minds the features and the personality of our late friend; and it forms a fitting and worthy memorial of him. The position, also, which has been selected for it is, I venture to think, an ideal one; and here I trust it will long remain for all to see, and to testify to all who may come after, to your appreciation of the man and of his work. It is a tribute to the memory of one who, endowed with commanding capacity that must have brought him to the front in whatever walk of life he elected to follow, devoted himself to the service of the industry which he inherited, and of those among whom his lot had



After the Unveiling of the Livesey Bust.

Those represented in the group (reading from left to right) are: Sir Fortescue Flannery, Mr. S. Y. Shoubridge, Mr. George Ross, Mr. Robert Morton, Mr. Charles Hunt, Mr. Sydney March (the sculptor), Mr. Jabez Light, Mr. John Boraston, Mr Charles Carpenter, and Mr. William Waller.



The Workmen at the Inaugural Ceremony.

been cast. It is also a tribute to that clearness of vision which sighted the goal from afar; and to that undaunted courage and determination by which all obstacles to it were overcome. It is a tribute, moreover, to his personal magnetism, his transparent sincerity and steadfast friendship, his generous appreciation of honest effort, his readiness to do battle for the right, regardless of personal consequences, his desire to do to others as he would be done by, his freedom from ostentation, and his solicitude for both the material and the spiritual welfare of those around him. But above all, it is a tribute to the immensity of his services to the wage-earner, whether past, present, or to come. You, his contemporaries, have assisted in the making of history—in the inauguration and development of a great social movement, the growth and spread of which it is impossible to foresee. You may remember that Sir George Livesey was much impressed by an observation made by the great Italian patriot Mazzini, to the effect that workmen were originally serfs or slaves; that they then became wage-earners; and that they were destined to become proprietors. The fulfilment of this prediction has already commenced. In the course of a long administrative career, Sir George did much to ameliorate and improve the conditions of employment; but his establishment of the system of co-partnership was the crowning achievement of an arduous and eventful life. The position of the system to-day is one of greater strength and vitality than ever before, and is a monument to the memory of its founder, with which even "storied urn or animated bust" cannot compare. Sir George built, indeed, upon no insecure foundation when for the maintenance and success of the system he relied upon the hearty co-operation of the general body of those who were to participate in its advantages; and it is not the least of its merits that it has brought industrial peace—meaning that the energy which was formerly expended in efforts more or less antagonistic is now wholly directed to the common good. And it is for all these reasons that we are all here to-day to do honour to the name and the memory of George Livesey. It is because he was a true friend to his fellow-men, and served them greatly, that you have desired to perpetuate his memory; and this memorial which you have raised will be a constant reminder of the good he accomplished. Will it not also remind us of what it may be in our power to do, if only we use our opportunities as he used his?

Mr. Robert Morton then addressed the assembly. He remarked that he would like to say a great many things, but as the oldest member of the Board he would content himself by remarking that it was a great satisfaction to the Board to know that the idea of the memorial originated among the employees and had been carried through to such a successful conclusion entirely by them, without any assistance from the Board. The memorial which had just been unveiled would be a stimulus to them all to perpetuate the work which Sir George initiated and successfully carried on for so long.

Sir Fortescue Flannery, Mr. Jabez Light, Mr. John Boraston, Mr. Charles Carpenter, and Mr. George Ross (Directors) also addressed the meeting, after which Mr. S. Y. Shoubridge proposed, and Mr. Charles Ohren seconded, a vote

of thanks to Mr. Hunt for unveiling the memorial, and this was carried by acclamation.

Mr. Hunt, in replying, said the Board had under consideration the question of providing a new building for the use of the employees, in place of the present recreation room; and it was proposed to call this the "Livesey Memorial Hall." It would comprise a hall suitable for meetings, concerts, &c., capable of seating about 450 persons, a billiard room for three tables, reading rooms, and refreshment rooms, &c.; and adjoining it there would be a bowling green. The Engineer had already submitted the plans to the Board, and the employees would have an opportunity of seeing them. If they had any suggestion to make, and would communicate with the Workman-Directors or the Engineer, they would be considered before the plans were finally approved.

A vote of thanks to Mr. Waller and the Memorial Committee closed the proceedings.

"METALLIC FILAMENT" GAS-MANTLES.

There is some promise that the term "metallic filament" will soon be as applicable to gas-mantles as to electric incandescent lamps, with the difference that whereas the metallic filament electric lamp is very fragile, the metallic filaments of the new gas mantles are peculiarly strong individually, and their interlacing in forming the fine mesh gives strength and power of resistance. The new mantles are the invention of Herr H. Reeser; and his patent specification was the subject of notice in the "Journal" for April 13 last. He is not the first inventor to essay to make mantles from finely drawn wire. Platinum has been used; and alloys of various kinds have been tried, but the low illuminating efficiency of the latter and rapid corrosion have done their work in destroying the hopes of the inventors. But Herr Reeser assures us that he has done better; and a sample of the wire-woven material that he has introduced to us induces at once an inclination to share his hope. In a short time, we shall have an opportunity of putting the invention to a test for confirmation. Herr Reeser uses a mixture of metals—silver being one of the principal constituents; and the wire produced looks like a thread of silk, being only 5-100ths of a millimetre in diameter. This is woven into a fine mesh; and then it is subjected to a process whereby a deposit of molybdenum is formed on it. The mantles both for upright burners and inverted are only 1¼ inches in length from top to bottom; and a special burner is used with them—seeing that the mixture of air and gas that has been found to be best approximates three volumes of the former to one of the latter. By means of special construction, the flow of the mixture is accelerated. Now there is a peculiar feature of this new mantle, in that the flame does not burn inside the mantle; but, being wire, combustion takes place on the surface of the mantle. The flame, however, is not perceptible; all that can be seen is the incandescent mantle—every filament in the mesh presenting the same appearance as the filaments of the new tungsten lamps of the electrical industry. Another point is that, by varying the constitution of the filaments, the inventor informs us that he can get any coloured light required. The mantles are not costly to make; so that they will be sold, when placed on the market, for quite a moderate sum. The efficiency is stated by the inventor to be high—85 candles for 2 cubic feet of gas per hour, at 1½ inches pressure. The useful life of the mantle is put at no less than 2000 hours, though there is a little depreciation after 1200 hours. But through life, the mantle is said to retain a good shape. Herr Reeser has been at work trying to produce a serviceable metallic filament mantle since 1895; and he is now perfectly satisfied with the success. His perseverance deserves reward. When there has been an opportunity of trying the new mantle, we shall have something more to say at first hand about our experience with it. This preliminary announcement will, we think, prove interesting to our readers.

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 525.)

Quietness was hardly the word to describe business on the Stock Exchange last week; for on one or two days absolute stagnation would be nearer the mark. Some exception may be taken to this view in relation to one market—the American; but that moves in exceptional lines which it is not our province to follow. To add to the slackness, the Exchange was closed on Saturday; thus reducing the period of possibility of action. The opening day gave indication of what was to come in point of quietude; and there was a general tendency in prices to droop from sheer inanition. Railways were dull, and the Foreign Market stagnant. Consols were, however, in favour, and advanced ⅛. Again on Tuesday movements were almost lifeless—except for American operations. Everything was dull, if it had any feature at all, and Consols fell with the rest. The weakness continued on Wednesday. Even the speculative departments were very quiet; but some Foreign Government issues were strong. Thursday brought a small degree of improvement. Home Government securities were quite good, and Consols picked up 1/16. But Railways remained shaky, and there was a smart American reaction. Friday was a bad day. Railways were depressed by the weather and some other adverse factors; and the dulness was more or less felt in almost all markets. In the Money Market, there was hardly any change in rates for short loans, the supply being abundant; but discount grew gradually harder until nearly the close. In the Gas Market, the shortage of business was to some extent felt in common with other departments; but the tendency was firm, and good things commanded good figures. Reports and accounts for the past half year to hand during the week confirmed previous indications that that period has been a good one for the industry, and some further increases in dividend are announced. In Gaslight and Coke issues, the ordinary was fairly busy and quite steady, transactions marking from 104 to 105. The secured issues were quiet; the maximum changing hands at 87½ and 88, the preference at 103¼ and 103¾, and the debenture at 86 and 86¼. South Metropolitan was very quiet at from 119 to 120; but the debenture was active at from 84¾ to 85½. Little was done in Commercials. The 4 per cent. realized 110, and the 3½ per cent. 106½. Among the Suburban and Provincial group, Brentford old was done at 250 and 252, ditto new at 191, Brighton original at 214, and West Ham at 124½ and 125. The preference and debenture of the last named had a further rise. The Continental companies were quiet. Imperial marked from 179½ to 180½, ditto debenture 96 (a rise of 1), Union 96 and 97—a fall of 1. Both Europeans advanced. Among the gas undertakings of the remoter world, Buenos Ayres fetched 13⅞, Monte Video 12⅝, Primitiva from 7 to 7⅛, ditto preference 5⅜, ditto debenture 94½, and River Plate from 16 13/16 to 17.

ELECTRICITY SUPPLY MEMORANDA.

The "Electrical Contractor's" "Must"—Municipal Trading in Wiring and Fittings: A Test Case Proposed—Electrical Contractors and Private Generation—Vulgarity—Transformation Losses—A Terrible Disaster and Minor Occurrences.

The Electrical Contractors' Association, with the House of Lords on their side and the House of Commons and the Government in opposition to them, have become a little assertive in tone in their monthly periodical. That the House of Lords are temporarily allowing the Association the distinction of their friendship should not cause the latter to lose their heads. The Electric Lighting Acts (Amendment) Bill, as our readers have been made aware, contains a clause empowering local authorities to enter upon the electric wiring and fitting business, providing it is run on lines that will cause income to cover outgoings in connection with it. The agitation of the Electrical Contractors' Association (upon their perseverance in which we congratulate them) attained its objective when Lord Avebury, the sworn foe of municipal trading, induced the House of Lords to insert in the clause giving permissive power to trade in fittings and appliances, the qualifying words "through a contractor, but not otherwise." The sweets of victory were not to be long enjoyed; for when the Bill reached Standing Committee "C" of the House of Commons, out came the words offensive to municipal electricity suppliers, although it was recognized by Mr. Tennant, the Parliamentary Secretary to the Board of Trade, that there might be a little difficulty with the Lords over the subject. It seems that the Electrical Contractors' Association have condescendingly expressed their willingness to compromise, by giving the municipalities the power to let on hire cooking appliances and the like, but the execution of the rest of the work connected with installations of any kind is to pass through no other channel but that of the local contractors. The municipalities have rejected the Association's advances. Under these circumstances, the Association say the Avebury amendment "must be" re-established or the clause must go. This is their ultimatum to the Government, the House of Commons, and the local authorities of the country. The power of such absolute decision must be a fine feeling. We have never tasted it in such a matter, so we do not know. According to the organ of the Association when the amendment was under consideration by Committee "C" "insane remarks" were made by members and "inane words" fell from the lips of one of these public men. That is not the way to coax those in authority into a different line of thought and action over the matter.

Turning to an earlier part of the same periodical, it is seen that the members of the Association are being canvassed for money guarantees, in order that a test case may be instituted to ascertain the legality of municipal electrical contracting upon isolated installations without special parliamentary authority. Being an incorporated Association, we suppose that champerty possesses no fears for the members. However, having just been reading of "insane remarks" and "inane words," it is interesting to observe in the editorial note on this matter that "particulars of innumerable cases have been received, some of the most 'fragrant' [*sic*] character; and Counsel has advised the Law and Parliamentary Committee that corporations have no such powers, and that an action would be likely to be successful."

Municipal trading in this manner, being responsible for making vast inroads in electrical contractors' profits, why should not the latter retaliate by showing the large customers of the municipal electricity undertakings how they can get electricity at a lower cost by having their own private generating plants than the price at which the local authority will supply energy to them. The

supply of these plants means profit; and their after-maintenance will bring grist to the contractor's mill. If the installation is not complicated by a suction-gas plant—which needs time in starting up, does not afford a constant quality of gas, and produces dirty valves and other unpleasantness—but the engine is fed with the clean and ever-ready gas of the town supply, there will be little trouble and very considerable gain to the electricity user. The recent action in which the lessee of the Worthing Theatre Royal was the plaintiff, and a local firm of electrical contractors the defendants, indicates that there is profitable work to be done in this direction. It was a claim for damages for negligent installation; the plant consisting of a "National" gas-engine, suction-gas plant, and dynamo. It appeared that in this case there had been no trouble prior to the machinery being placed under the care of an attendant who could neither read nor write. Mr. Justice Bucknill, after a trial lasting several days, attributed the troubles that had arisen entirely to the carelessness of the attendant; and what was more he refused leave to appeal. Had the engine been supplied with town gas, we very much doubt if even the illiterate attendant would not have scraped through without trouble.

One further reference to the "Electrical Contractor." When in argument, there is no need to drop into vulgarity. A paragraph in the August issue is headed "More Gas Lies." The Wandsworth and Putney Gas Company are accused of being the circulators of the particular alleged untruths that have angered our monthly contemporary into giving vent to a little abuse. The Company, in their circular, compare gas at 2s. per 1000 cubic feet with electricity at 6d. per unit. This is not an unusual price for lighting units; and the Wandsworth Company supply gas for lighting at 1s. 11d. per 1000 cubic feet. Then the "Contractor" appears to doubt, but is afraid to positively say it is not the case, that 50-candle power incandescent gas-burners can be obtained which consume only 2 cubic feet per hour each. There are several inverted incandescent gas-burners on the market that will return an efficiency of 25 candles per cubic foot; and there is no question that the Wandsworth Company will be quite prepared to prove this, photometrically and by test-meter, to the Editor of our contemporary if he desires it. The Company take in their comparison the commonly used carbon filament electric lamp, using 4 watts per candle-hour during its life. There is no "lie" about that being a fair average consumption during the life of a carbon filament lamp. In 1500 hours a 50-candle power inverted incandescent lamp, using 2 cubic feet of gas an hour, will consume 3000 cubic feet of gas, which at 2s. represents 6s.; at 1s. 11d. (the current price), 5s. 9d. A 50-candle power carbon filament lamp will use 200 watts an hour; and therefore a unit of electricity would be registered by five hours' use of the lamp, and 300 units by 1500 hours' use. 300 units at 6d. work out to £7 10s. Where is the "lie" there? and where is the common sense about our contemporary's complaint? If a 50-candle metallic lamp is used for 1500 hours, it will consume 93 units of electricity at 1·25 watts per candle; and 93 units at 6d. will work out to £2 6s. 6d. Is there a "lie" about that?

A short article has appeared in the "Electrical Review" having for its intent proof that the attention now being given by manufacturers and others to the design of a reliable automatic switch to save the no-load losses in small transformers is practically valueless labour. The scope of application for these auto-switches is very limited—in fact, the writer has a doubt in his mind as to whether there would be any real benefit even to users of transformers up to 1 kilowatt an hour. The losses in this size are about 20 per cent. of the full-load current—that is, 10 watts on the 500-watt size; this being the size of the majority of transformers for house and small shop lighting. Taking the average lighting hours as 4½ per day, this would give 19½ hours loss per day of 10 watts = 195 watt-hours. This represents 71 units per annum, which, at 4d. per unit, would cost 23s. approximately. By spending more money on the original cost of the transformer for a better quality of iron, this loss may be reduced by 40 per cent., or to about 14s. The cost of the 500-watt transformer is somewhere in the neighbourhood of £2; so that an extra 10s. or 15s. or so is not a great item to pay for the better iron and lower loss. The cost of the auto-switches at present on the market is about £3 each. Therefore, by using a £3 switch, 14s. per annum can be saved on a bill amounting to (say) £6 or £7 after 4½ years, which time is wanted to pay for the switch! All these savings and calculations, however, are based on the assumption of perfect working of an automatic device, which, unfortunately, is rather a rarity in practice. This significant remark is found towards the close of the article: "The metal filament lamp is quite delicate enough, without adding to our present many chances of failure." The article is useful, as it gives electrical testimony—not our own—as to the cost (including the electrical losses) of transformation for metallic filaments.

The danger of allowing wires conveying high-tension current to cross, or to be in proximity with, wires conveying current for lighting purposes, has had deplorable illustration in the catastrophe that has brought severe mourning to the Italian village of Olginate, near Lake Como. During a thunderstorm last Wednesday, the high-tension wires from the power-house were broken, and, in falling, they came into contact with the wires carrying the current for electric lighting. According to the reports to hand, a "short-circuit" was produced in every house. Instinctively there was a rush in the houses to switch-off the current to prevent the danger of fire. Every house in which there was electricity was for the time being a death-trap. Twelve people were killed; and twenty-nine received severe shocks and burns. Wires caught fire and fell from the walls, on to the terrified occupants of the rooms. All the lights were extinguished; and the darkness intensified the terror of the people. Life in the village has since been paralyzed by the terrible occurrence. The art of the engineer is to direct the great sources of power in Nature for the use and convenience of man; but, as the event proved, the work, if we may depend on the reports, was not well directed in this instance, or there would have been no possibility of contact in the event of an accident to the high-tension wires.

Round about Portsmouth, there have been some terrible panics through the fusing of electric wires. Some time ago a huge toy bazaar was reduced to ashes; and the conflagration started and got a big hold of the flimsy goods while the place was packed with Christmas customers—mostly ladies and children. Now at the Victoria Hall at Southsea, the fusing of a wire in a cinematograph apparatus, causing a film to momentarily flare up, created such alarm among the children who principally constituted the audience that there was a wild rush to the doors. In the panic, one little fellow lost his life, and eight other children were severely injured. As it happened, there was no occasion for the rush; but women and children are easily scared. Fortunately, the Barnsley catastrophe was not repeated in this instance. It is evident that, with the uncertainties of electricity and the ease with which cinematograph films will fire, some better means ought to be taken for preventing panics at entertainments of this kind.

On the same day that there was this lamentable trouble at Southsea, Bermondsey had a little excitement of its own through the capability of electrical distribution systems to generate their own gas, ignite it, and cause explosions that create, according to the veracious daily news recorders, "considerable alarm." Distributed town's gas falls far short of any glory that may attach to the ability to complete this cycle of operations within its own distribution system. The gas must escape from the pipes before an explosive mixture can be formed, and a light must be applied before there can be an explosion. The necessary air is waiting in the electrical culvert for the generation of gas from the insulating material; and the cable furnishes the igniting spark. Thus the whole thing is complete; and thus the lids of two pavement boxes and about a dozen paving-stones round each, were sent flying into the air at Bermondsey without any preliminary notice whatever. The interiors of the boxes were fractured and the cables injured. Two boxes opposite the Law Courts in the Strand were testifying to the ability of electricity in the same way only the other Sunday. That such things should be, does not improve one's confidence in the safety of the footways of our streets. Not only in the streets but in buildings, electricity has been busy lately asserting its destructiveness. One example has been at the General Electric Company's Works at Witton. Greater respect is surely due to the Company from electricity. The seat of the fire was behind a switchboard in the testing department. The origin of a fire at the British Alcohol Company's works at Canning Town last Thursday is attributed to the fusing of a wire; but the inflammable nature of the contents of the building caused a small beginning to end in costly disaster.

The Lime-Nitrogen Industry.—The annual report of the General Company for Cyanamide in Rome gives some interesting information about this modern industry. The manufacture of this fertilizer is going on at six places, in addition to which a new Company has been started in Bavaria, while others are in course of formation. Last year two sale bureaus were erected—one for Northern Europe, domiciled in Berlin, and comprising Germany, the Netherlands, Denmark, and Finland, and the other one for Southern Europe, domiciled in Paris, comprising France, Switzerland, Spain, and Portugal. During the months of January and February, 26,000 cwt. were sold in Germany and 5000 cwt. in France. The information from the large installation at Odde, in Norway, appears to be encouraging; at the East German works the annual production is calculated at 2500 tons; while the capacity of the first works of the American Cyanamide Company, on the Canadian shore of the Niagara, is 5000 tons a year. A Japanese Company has been formed in Tokio; and preparatory work is going on in India, Canada, and South Africa.

Prizes of the Société Technique for Next Year.—The "Journal des Usines à Gaz" for the 5th inst. contains full particulars in regard to the prizes offered by the Société Technique in connection with next year's congress. At the head of the subjects stand the small domestic gas-engine and the various uses of gas for lighting with or without high-pressure. The other subjects include appliances for the manufacture or utilization of gas, incandescent gas-burners, apparatus for lighting gas-burners at a distance, for the domestic use of gas, for the industrial and domestic use of coke, and generators for the production of poor or water gas by the utilization of gas-works coke. The prizes are of the maximum value of 10,000 frs., 8000 frs., and 5000 frs., according to the subject, and they are awarded at the general meeting of the Society in June. They are open to the competition of anybody, whether a member of the Society or not. As usual, prizes will be awarded for the best papers submitted at the meeting next year. Any further information on the subject can be obtained on application to the Secretary of the Society, M. Payet, No. 94, Rue St. Lazare, Paris.

PERSONAL.

Mr. WILLIAM ROGERSON, of Reading, has been appointed Manager of the Bollington Gas-Works, in succession to the late Mr. H. Froggatt, whose death occurred a few weeks ago. There were 25 applicants for the post, the salary attached to which is £2 2s. per week. The engagement is terminable by a month's notice on either side.

As will be gathered from the report of the proceedings elsewhere, the proprietors of the Croydon Gas Company were gratified at their meeting on Friday to learn from their Chairman (Mr. Charles Hussey, J.P.) of the honour that had been conferred upon Mr. JAMES W. HELPS, the Engineer and General Manager, in his election as President of the Institution of Gas Engineers. From several quarters, the President was warmly complimented.

OBITUARY.

Reference has already been made to the illness of Mr. T. J. COTTON, the Gas Examiner to the Corporation of Dublin, and to the appointment of his son, Mr. Henry J. Cotton, to temporarily discharge his duties. We regret to record that the illness has terminated fatally.

The death occurred very suddenly early last Friday morning of Mr. DAVID JONES, the Manager of the Dowlais Gas-Works. Deceased went to Dowlais forty years ago, and was for ten years employed at the steel-works. He entered the Gas Company's service as Secretary, and afterwards became Manager. He was on the Council of the Wales and Monmouthshire District Institution of Gas Engineers and Managers. Mr. Jones was in his 60th year, and he leaves a widow, four sons, and four daughters.

The death occurred early last Wednesday morning, at the advanced age of 93, of Sir THEODORE MARTIN, the Chairman of the Brymbo Water Company. Deceased was a distinguished member of the Parliamentary Bar; and a fitting tribute to his ability was paid before a Select Committee of the House of Commons in the course of the day by Mr. Balfour Browne, K.C. Sir Theodore was senior partner in the firm of Messrs. Martin and Leslie; and took part in the business almost to the end of his days. He was also a literary man, and was the author of "The Life of the Prince Consort."

The current number of the "Journal des Usines à Gaz" contains a notice of the life-work of the late M. EMILE CAMUS, who for 45 years took a prominent part in the management of the old Paris Gas Company. The deceased gentleman, who was in his 88th year, entered the service of the Company in 1861, under M. de Gayffier, the General Manager; and he eventually took the leading position in the administration of its affairs. He conscientiously fulfilled all the engagements entered into by the Company under their concession; and upon the occasion of his funeral at Père Lachaise, M. Sauton, who had been the most energetic defender of the interests of the City in the Municipal Council, rendered to his loyal opponent and to Madame Camus the testimony of his respectful consideration.

The German Gas-Mantle and Electric Lamp Taxes.

Reference was made in the "JOURNAL" for the 10th inst. (p. 390) to the taxes on incandescent mantles and electric lamps which come into operation in Germany on the 1st of October. The taxation applies to all electric glow lamps and burners, to incandescent mantles for gas, spirit, petroleum, or similar incandescent lighting, to carbons for electric arc lamps, and to mercury vapour and similar electric lamps. The scale of taxation for electric glow lamps with carbon filaments is 0·6d. per lamp up to 15 watts, 1·2d. from 15 to 25 watts, 2·4d. from 25 to 60 watts, 3·6d. from 60 to 100 watts, and 6d. from 100 to 200 watts. Metallic filament lamps, Nernst lamps, and other glow lamps not having carbon filaments are taxed at double the foregoing rates. Above 200 watts the tax increases at the rate of 3d. per 100 watts for carbon filament lamps, and of 4·8d. for other lamps. Mantles for incandescent gas or similar burners are taxed uniformly at the rate of 1·2d. per mantle. Carbons for electric arc lamps are taxed at the rate of 3½d. per pound if of simple carbon, and at the rate of 5·4d. per pound if of treated carbon for flame arc lighting. Mercury vapour and similar lamps pay at the rate of 1s. per 100 watts. The whole of these taxes apply only to lamps and mantles for use in Germany, and not to exports. It will be seen from the foregoing scale that the incidence of the new tax is relatively far heavier on gas consumers than on users of the electric light.

Electrolysis of water-mains at Winnipeg has been investigated by Professor L. A. Herdt, of the M'Gill University, who reports that the soil there has a very low electric resistance, and only a very small difference of potential can be allowed in rail-returns. He states that all bonds of which the resistance is greater than that of 4½ feet of rail must be improved, and insulated feeders substituted for ground plates at the sides of bridges to carry the current across the river.

TEN YEARS' PROGRESS OF GAS UNDERTAKINGS.

By G. M. GILL.

A COMPARISON of "Field's Analyses" for the years 1898 and 1908 shows in a striking manner the progress made by gas undertakings during a period which has been one of strenuous competition. It speaks well for the stability of the gas industry that it has not only been able to withstand the attacks of its competitors, but has been able to forge ahead into territories which, years ago, were deemed impenetrable. Especially is this the case with the remarkable popularity of the slot-meter, which has enabled gas undertakings to broaden the base upon which the future prosperity of the gas industry so entirely depends. How much this development has progressed is shown by the fact that the number of consumers has increased out of all proportion to the quantity of gas consumed. That disadvantages arise from this state of affairs is undoubtedly true. This is particularly noticeable in the direction of increases in capital indebtedness and the cost of distribution; but, in spite of the extra demand on capital, it is satisfactory to note that the capital employed per 1000 cubic feet of gas sold shows a reduction as a result of ten years' working. For the purpose of these comparisons, the figures of the Metropolitan, Suburban, and Provincial gas companies are taken as instances to show the general trend and progressive nature ot the gas industry in England during the period stated.

CAPITAL EMPLOYED PER THOUSAND FEET SOLD.

In this respect the average of the companies shows a reduction from 10s. 9d. to 10s. 5d., or, in other words, from £537 to £520 per million cubic feet sold. Without being substantial, it must certainly be considered satisfactory, especially when it is borne in mind that the requirements of recent years have necessitated large outlays of capital. The tendency of recent years has been to introduce machinery and increase the amount of capital employed with a view to saving large sums hitherto expended on labour. And not only in this direction has there been a demand for increased capital; the installation of slot-meters, with the attendant expense of fitting new services for a comparatively small return, has cost large sums of money which in past years it has not been necessary to expend. Another factor tending in the same direction is the greatly increased cost of modern retort-house installations. With elaborate regenerative settings, stoking machinery, stage floors, coke-conveyors, and coke screening plants, it is easy to exceed several times over per million of output the cost of simple direct-fired settings with none of the appliances of modern experience. It speaks well for those responsible for the administration of the companies concerned that the capital employed per 1000 cubic feet has been actually reduced. To mention one typical instance, the Commercial Gas Company in 1898 had 32,701 consumers, using, on an average, 69,547 cubic feet of gas per annum. In 1908, the consumers had increased to 91,690, or nearly three times greater, with a corresponding consumption of 33,251 cubic feet, although the total amount of gas sold had only increased by 30 per cent.—*i.e.*, from 2,401,209 to 3,123,155 cubic feet per annum. In the same period, in spite of this enormous increase in the number of slot-meter installations, the capital employed per 1000 cubic feet sold has only risen the moderate amount of 6d. per 1000 cubic feet—from 8s. 8d. to 9s. 2d. This is a case in which the bulk of the development in slot-meter installations has been compressed into the short period of a few years only; and it is not surprising that, in similar cases, where there has been no large increase in gas sales, there should have been a fairly substantial increase in capital indebtedness.

CAPITAL CHARGES PER THOUSAND FEET SOLD.

The capital charges per 1000 cubic feet of gas sold show a satisfactory reduction from 9·8d. to 8·7d.—an improvement considerably greater than the reduction in the "capital employed." At first sight, this would appear anomalous; but it is undoubtedly chiefly attributable to the infinitely better financial policy brought about by the action of the auction clauses in the raising of capital. It will be remembered that these clauses, introduced in the year 1877, stipulate that, in raising additional capital, provision must be made for the offer of such capital by public auction or tender at the best price which can be obtained. Before the auction clauses came into force, the shareholders benefited at the expense of the general prosperity of the companies in which their capital was invested. To take a case in point, one company shows, under the heading of capital employed per 1000 cubic feet of gas sold, 10s. 9d. in 1898 and 12s. 8d. in 1908; but under capital charges, 9·13d. in 1898 and 8·74d. in 1908. Thus, in 1898 7·25 per cent. interest and dividend was being paid on 10s. 9d. of capital, and in 1908 only 6·01 per cent. was being paid on 12s. 8d.—showing plainly that since 1898 capital has been raised on cheaper terms, and has not, as in the past, been given away in the shape of premiums to existing shareholders. As further proof of the value of these clauses, it is noticed that while in 1898 an average of 8·02 per cent. was being paid on the capital employed, in 1908 this had been reduced to 7·09 per cent. It should be pointed out that this is a substantial reduction when the proportion (obviously small) of capital raised since 1898 compared with that raised before that time is taken into consideration.

PRICE OF GAS.

In respect of the price of gas, the progress made has not been so substantial as might have been expected. The average price

of the Metropolitan, Suburban, and Provincial companies has been reduced from 2s. 7·6d. to 2s. 6·5d.—a reduction which should have alone been brought about by the decrease in the capital charges per 1000 cubic feet. In this connection, a counteracting influence should be mentioned.

Distribution Developments.

The reference is to the enormous increase in the number of consumers, amounting to 105 per cent., and the much smaller increase of 29 per cent. in the quantity of gas sold. This has naturally resulted in a smaller sale per consumer; the average quantity having dropped from 51,886 to 33,361 cubic feet—a reduction which has increased the cost of distribution to a considerable extent. It should, however, be mentioned that, if the gas supplied by the Gaslight and Coke Company is excluded, the actual increase in the consumption from 1898 to 1908 has amounted to nearly 49 per cent. The reduction in the average consumption is, of course, chiefly accounted for by the fact that slot-meter users, of which there are now so large a proportion, only consume some 10,000 cubic feet per annum; and as in the case of some companies the number of slot-meters actually exceeds the number of ordinary meters, it is not surprising that the average consumption has substantially decreased. Again, this is partly due to the greatly increasing number of users of incandescent burners, who have been able to brighten their homes at a greatly reduced consumption of gas.

The enormous increase of 105 per cent. in the number of consumers in a period of ten years is proof of the fact that the gas industry has been placed on a much broader basis, which is of itself a matter of great importance, increasing in no small degree the stability of the capital employed in the industry. The extra attention which consumers now receive is well illustrated by the additional expense allotted under the heading of distribution. This item includes salaries and wages, wear and tear of mains and services, and meter and stove repairs. In 1898 distribution only amounted to 3·02d.; whereas now it costs 5·08d. It would appear as though the reduction from 51,886 to 33,361 cubic feet in the quantity of gas used has a counterpart in the increase of about the same proportion in the cost of this work.

Cost of Coal and Oil.

This item has increased from 14·12d. to 16·18d. per 1000 cubic feet. The increase would have been considerably larger were it not for the fairly general rise in the make of gas per ton of coal, and the replacement of a certain amount of coal by oil for the manufacture of carburetted water gas, which is now used in much greater proportion than it was ten years ago.

Carbonizing Wages.

So much attention has been paid to the working of stoking machinery, and so much has been done to develop to the full its possibilities during the past few years, that it is not surprising to find that there has been an average saving from 3·62d. per 1000 cubic feet in 1898 to 2·27d. in 1908. Some credit must, however, be given to the effect of the more general adoption of water-gas plant, which would, of course, have the result of reducing this figure. Taking into consideration the extensive development in the introduction of machinery, it is satisfactory to notice that the cost of wear and tear is almost identical in the two years 1898 and 1908. In the former years it was 3·62d., as against 3·69d. in the latter.

Purification.

This is now being carried on with considerable economy at a cost of 0·40d. per 1000 cubic feet, compared with 0·74d. in 1898; and it is noticed that if the Metropolitan and Suburban companies figures are taken separately from those in the Provinces, there is the substantial fall from 0·80d. to 0·31d. in the cost of this work. In spite of this notable reduction in cost, it is highly satisfactory that there have been, as was confidently anticipated, no complaints of any kind on the part of consumers in districts where purification from sulphur compounds has been abolished.

Rates and Taxes.

Rates and taxes show a small increase from 1·73d. in 1898 to 1·79d. in 1908. Without in any way depending on the amount of the net profit of a company, it is unsatisfactory that the proportion appropriated in this way, as compared with the net profit, continues to increase. Thus the ratio of the rates and taxes to the net profit, as represented by the capital charges, has risen from 17·6 per cent. in 1898 to 20·5 per cent. in 1908.

Residuals.

Very little difference is noticed in respect of residuals.

Coke.—The quantity of coke made for sale is exactly the same at 9·32 cwt. per ton of coal in the two years under comparison. This is disappointing, as an increase might well have been expected, taking into consideration the almost general adoption of gaseous firing of recent years, and its consequent economy in fuel consumption,. The lack of improvement may be distinctly traced to the extra breakage of coke resulting from the use of discharging machinery, particularly the now obsolete drawing machine, and the evil of a long drop for the coke necessitated by all stage-floor houses, except those in which coke-conveyors have been installed; and in these cases it is a matter for doubt whether the breakage of coke is not accentuated to an even greater degree by their use. There is good reason for suggesting that the disappointing figures in connection with coke production are due to mechanical appliances of one sort or another. That this is so is shown by the fact that the revenue from the sale of breeze has increased from 0·14d. per 1000 cubic feet in 1898 to 0·25d. in 1908—due to the large quantity now made and sold per ton of coal carbonized. This is especially the case with the Metropolitan Companies. In 1898, the revenue from breeze was 0·18d. per 1000 cubic feet; now it is 0·39d., or over double as much. The terms "hand-made" and "machine-made" coke are familiar enough to suggest that a great deal more attention should be paid to the careful handling of this product. In the matter of revenue from coke sales in 1898, the average was 5·29d. per 1000 cubic feet sold; while in 1908 it was 6·08d.

Tar.—This bye-product, with its valuable constituents, shows some slight improvement in price per gallon during the period of ten years. In 1908, the companies concerned in this comparison sold their tar at an average price of 1·14d. per gallon, as against 1·10d. in 1898. But if the figures per 1000 cubic feet sold are taken, it is found that the revenue from tar amounted to 1·13d. in 1898, compared with 0·99d. in 1908. This decrease is partly accounted for by the smaller production of tar per ton of coal. In 1898, this was 10·7 gallons; while in 1908 it had fallen to 10·1 gallons. Further, an increase in the proportion of water gas made would have a similar effect.

Ammonia.—In this respect, the average receipts have increased from 1·35d. per 1000 cubic feet in 1898 to 1·69d. in 1908. The satisfactory state of the market in this artificial fertilizer is fairly attributed to the efforts of the Sulphate of Ammonia Association and the successful way in which they have brought the valuable properties of this manure before the notice of users.

Meter and Stove Rental.

It will be noticed that the items of meter and stove rental have increased considerably. It is the natural outcome of a smaller output per meter and greater development in cooking stoves.

Conclusion.

Though only the main items have been under consideration, it will be noticed that the reduction in the average price of gas in the period of ten years tallies very closely with the difference in the main items included in the table. The reductions in wages and purification and in capital charges are particularly satisfactory; and the same may be said of the charge for wear and tear, taking into consideration the various factors which would tend to increase this item. Of the remaining figures, it will be seen that the increase in the returns from residuals pays for rather more than half the extra cost of coal; while the increased returns from meter and stove rental goes a long way towards counterbalancing larger expenditure on distribution. Though the progress shown, as represented by the price of gas is not very great, it may yet be confidently asserted that much has been done to pave the way towards a prosperous future, especially in the modernizing of works and in the attention given to consumers in recent years.

Expenses—Pence per Thousand Cubic Feet Sold.

	1898.		1908.
Coal, including oil and spirit	14·12	..	16·18
Carbonizing wages	3·62	..	2·27
Purification	0·74	..	0·40
Wear and tear	3·62	..	3·69
Distribution	3·02	..	5·08
Rates and taxes	1·73	..	1·79
Capital charges	9·80	..	8·70
	36·65	..	38·11
Receipts.			
Coke	5·29	..	6·08
Breeze	0·14	..	0·25
Tar	1·13	..	0·99
Ammonia	1·35	..	1·69
	7·91	..	9·01
Meter rental	0·88	..	1·39
Stove ,,	0·46	..	1·46
	9·25	..	11·86
Deduct receipts from expenses	= 27·40	..	26·25

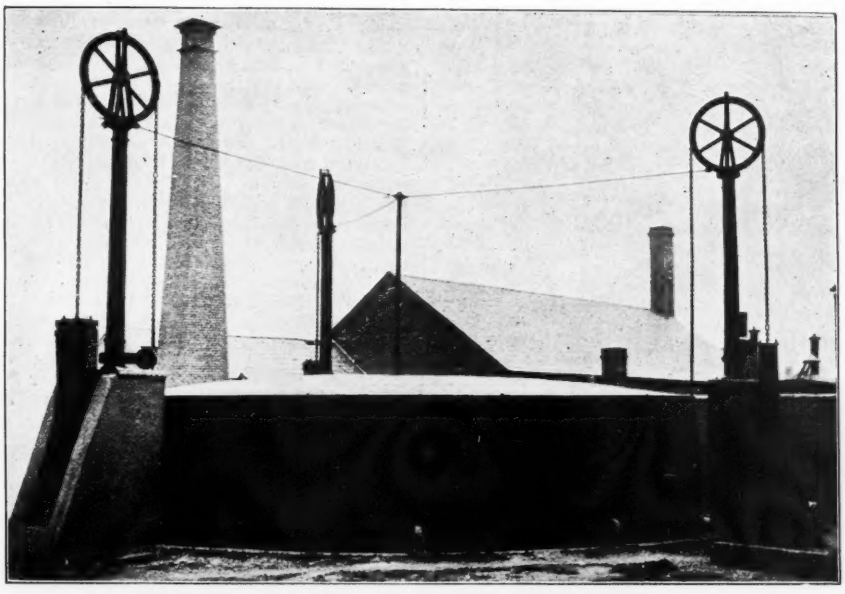
A saving of 1·15d. per 1000 cubic feet.

Oxy-Acetylene Blowpipe.—In the "Notes on Gas Lighting" in a recent number of the "Ironmonger," reference was made to an interesting account given in the "Revue des Eclairages" of a new installation of the oxy-acetylene blowpipe carried out in Bucharest by the Société Italo-Roumaine. The factory contains plant for the manufacture of oxygen by the Linde process, low-pressure acetylene for illumination, compressors for supplying dissolved acetylene, and, finally, an equipment for demonstrating acetylene welding with both the Fouché and the Cyclops blowpipes. The Linde oxygen plant can deal with nearly 8500 cubic feet of air in 24 hours. No use having been found for the nitrogen, it is allowed to escape; but the oxygen is stored in a gasholder, from which it is withdrawn for compression. Our contemporary says: "It is interesting to note that the authorities seem quite converted to the use of acetylene; the management of the railways having decided to introduce autogenous welding into the workshops, while the Minister of Public Works is having experiments made with dissolved acetylene as a means of illumination for the buoys and floating lights on the Danube."

AN INTERESTING RELIC OF MURDOCH.

Last Tuesday was a memorable day in the history of Birmingham, for it was the centenary of the death, at the age of 81, of Matthew Boulton, whose name, in association with that of his partner James Watt, figures so conspicuously in the commercial history of the capital of the Midlands, and whose life-work contributed so largely to its prosperity. Boulton was the son of fairly well-to-do parents; and this fact and a fortunate matrimonial alliance enabled him to start the world-renowned Soho Foundry. It has been proposed that something should be done in the way of honouring the name of Boulton. One proposal is the establishment of a scholarship in Mechanical Engineering for the Technical School at Handsworth (where he was buried) to the Birmingham University; and another is the erection, in front of the Handsworth Council House, of a statue of Boulton, very possibly to be followed by others of his partner and his partner's right-hand man—William Murdoch. We venture to think that the three men are well worthy of this recognition. Boulton was no inventor; but he had the money. The Soho Foundry—begun in 1775 and started early in 1776—had £40,000 sunk in it before any profit was earned. Watt had the inventive faculty, but he was incompetent in commercial affairs. Three years after the works were started a man called there in search of employment; and he obtained it. It was Murdoch—the man who will be associated with gas lighting as long as the world endures.

It is unnecessary to deal at length here with the work done at Soho in connection with gas, but only to present our readers with



A Gasholder Constructed by Murdoch (in 1798) still in Use.

irrefragable evidence that it was done well. About fourteen years ago, the Soho works passed into the hands of Messrs. W. & T. Avery, Limited, the well-known makers of weighbridges and weighing-machines, whose business was established in 1730—two years after Boulton was born. Among the other plant which they then acquired was a gasholder which Murdoch constructed in 1798, and which is still in service. It is shown in the accompanying illustration, which we produce from a photograph supplied by Messrs. Avery.

The holder has a capacity of 20,000 cubic feet; and it will be noticed that there is very little difference between it and one of to-day, except in the centre leading guide, which consists of a rod passing through the centre of the holder. It appears that there were originally two gasholders made with the central rod; and it is not a little strange that one of them should still be in daily use on the very site where it was erected. Reference in the "Birmingham Daily Post" to the existence of this holder brought a letter from Messrs. Avery bearing out the statement; and they added: "Workmanship which thus stands the test of well over one hundred years must, at the outset, have been characteristic of the thoroughness of the old Soho Foundry, where the famous partners laboured."

Before closing this article, it should be mentioned that complete illustrations and a detailed description of the Soho Works, just before they passed into the hands of Messrs. Avery were given in the "Engineer;" and that to an article in the current number of that publication we are indebted for some of the historical particulars here given.

NEW DESIGNS IN INVERTED LAMPS.

The demands of customers, and the pressure of competition with lamps of varied quality in constitution, necessitate that makers shall be ever enlarging their ability to comply with desire, and thus to resist the inroads from other quarters upon the patronage they have cultivated. That is an indispensable condition in the commercial struggle of the times. For excellent lamp work, Messrs. Podmore and Co. have an established reputation; their productions incorporating strength and scientific and practical attributes. But they have found that high-power lamps are in request which are lighter in build, and somewhat less expensive than their standard types, and yet lamps in which the efficiency shall not be a whit inferior, or the facilities afforded for maintenance not in any way impaired. A range of such lamps for street, shop, or factory lighting, have therefore now been developed—from one to four inverted burners, and more if desired; and it may be taken that each burner in these lamps, consuming 3¾ cubic feet per hour at about 2 inches pressure, will give an efficiency of 40 candles per cubic feet. In all of the firm's lamps, the regenerative principle is applied as far as possible; and to this is attributed success.

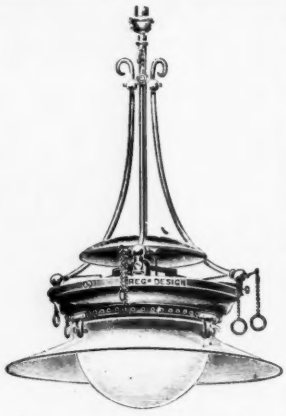
It is unnecessary to describe in detail each one of this new series of intensive inverted lamps, as, excepting the variation of outside dimensions and the number of burners, in principle they are all constructed, from the one burner size to the four (or other number), on practically the same lines. Take, then, the three-light lamp as an example. Each burner is of cast metal, with air and gas regulator, by which the finest adjustment can be secured. The case is of copper, and it has a dome reflector. Just above the reflector a portion of the cylindrical top of the casing is formed so that it can be raised and held suspended, and all the upper parts of the vertical burners, with the adjusters, are exposed to view; or the same movable part can be had with a doorway so that it can be revolved instead of lifted, and attention be given to each burner separately by means of the door. An enamelled steel frame, held by a catch, supports the globe, which can be had plain, or for shop lighting with opal on the side facing the road, and plain on the shop window side. A reflector divides the upper from the lower part of the lamp; and as the products of combustion are all collected in a chamber and conveyed away by a central chimney, the primary air supply to the burners cannot be vitiated. The primary air being taken into the large annular chamber formed by the outer casing with the central chimney (containing the hot products of combustion) running through, nothing is supplied to the bunsens that has not been preheated. Round the inverted mantles protective glasses are suspended; but the use of these glasses is largely a matter of choice. It is not found that they enhance the illuminating power; but in street lighting they do serve as a protection to the other mantles when one is being changed.

It has been remarked that each burner consumes 3¾ cubic feet per hour; if fitted with a flashing pilot light, a liberal total consumption will be 4 cubic feet. The pilot light, under normal conditions, is but a small blue flame; on the gas being turned on, the jet elongates, ignites the gas at the burner, and then gradually subsides again to the small blue flame. This is shielded from all draught by being fitted just above the reflector. It is altogether a good looking lamp, and well finished. Though lighter than the

firm's preceding standard patterns (to which they still accord premier position), the lamps give an excellent account of themselves; and the readiness with which renewals of any part can be effected will cause maintenance to be comparatively low. It may be taken that, consuming 3¾ cubic feet of gas per hour, each burner gives an illuminating power of 150 candles; and three 450 candles. This illuminating power is not attained immediately on lighting up; but it proves the effect of the preheating of gas and air, that it is not until the lamp is well heated that the maximum illuminating power is obtained, and then the light is brilliant. The four-burner lamp is built rather stronger than the three-

New Four-Burner Inverted Lamp for Street Column.

(The Controller is on Top of Standard.)



No. 2003 "M. G." Lamp, with Reflector.

burner one; and this has been designed to compete with the Graetzin form of lamp. The two and one burner lamps will have their particular spheres of application. Though rather more expensive, the predecessors of this new series of lamps still retain favour for strength and durability. In them, regeneration is likewise provided for; they have strong angle burners; and the means of gas and air adjustment are all outside the lamp, and so kept cool, allowing regulation to be made at any time. The burners, too, are all separately controlled, so that one or any number of the burners with which the lamps are fitted can be used as required.

A simple high-power shadowless lamp, with a cluster of three inverted burners, is another new pattern; and it is particularly suitable for restaurants and dining-rooms. Between the pendant and the burners there is a simple dome-shape protector; and below this is suspended a well-expanding ornamental shade of graceful outline, and tinted towards the edges. The mantles can be enclosed in a glass bowl or left exposed just as desired. The effect either way is good. The burners are of the angle type, with gas and air adjustments outside the path of the rising heat from the mantles. Preheating is secured by the construction of the burner. The inlet for the gas and air is small; and the bunsen tube gradually expands in internal diameter to a mixing chamber before passing to the nozzle of the burner; so that throughout the travel room is given for the expansion of the combustible mixture. Each burner consumes 3 cubic feet of gas per hour, and the efficiency is from 40 to 45 candles per cubic foot, according to pressure and quality; so that, taking the lower duty, the total illuminating power is 360 candles.

The 2003 "M. G." lamp is another new type. It is a lamp with a comparatively shallow head, and can be had fitted with one, two, or three burners. As required, it is furnished with a large reflector, or without. Enamelled in a cream colour, and outlined with gold, it is a handsome lamp.

But there are so many new designs to be seen in the showrooms of the firm that description would necessitate much more space. We must content ourselves therefore by saying that the "Ivex" lamp, one of the inverted regenerative lamps, with perpendicular burner, arrests attention both for neatness and efficiency. The firm have also made a speciality of lamps fitted with angled reversible globes, with opal one side and plain glass the other; so that if the opal part is being used at the bottom the light is reflected upwards to the ceiling, and a soft, well-diffused illumination is the result. If a strong light is wanted immediately under the lamp, by reversing the globe with the opal part at the top, the light is directed downwards. Several new designs of lamps for use in tropical climates, where dust and insects demand special consideration in the construction, are to be seen. The square type of street lamp with inverted burners continues in good demand—in fact, in these days, almost all new lamps are fitted with the inverted burner; the upright form being now much neglected by customers. It is not surprising.

Before concluding this notice, a new and special burner for domestic use may be referred to. It is a burner in which certain new features have been introduced all combining to give efficiency, and to preserve a cleanly and cool appearance. The burner is an inverted one, with all parts china-cased in the path of travel of the heated products. The burner is fitted with a globe, angled top and bottom, and reversible; so that, as explained previously, the opal part may be at the bottom for upward reflection of the light to the ceiling, or with the opal part at the top a good downward light is afforded. It is a very neat burner, is fitted with gas and air adjustment, and has a special outlet for the lateral escape of the products of combustion, so preventing discoloration of the fittings. The standard size consumes from 2¼ to 2¾ cubic feet; and the light is soft and attractive. This lamp should meet with a good demand.

The "Domestic" Burner.

HIGH-PRESSURE GAS IN THE CITY OF LONDON.

Further Extensions.

SINCE we chronicled the early continuation of the Fleet Street high-pressure gas-main to the offices of "Punch" and the "News of the World," in Bouverie Street, further large extensions are taking place and are contemplated. The main has been carried through Crane Court to serve Messrs. Shaw and Sons, printers, in Fetter Lane. Last week a further extension was made, whereby the main was taken down Whitefriars Street and Hanging Sword Alley to the large building of Messrs. E. Lloyd and Co., which extends from Salisbury Square to Whitefriars Street; and now it is being continued farther east, across Ludgate Circus to the foot of Ludgate Hill, then going northwards up Farringdon Street as far as Seacoal Lane towards the Old Bailey, where it will be tapped to supply the large printing establishment of Messrs. Cassell and Co., Limited, running into Fleet Lane and Belle Sauvage Yard. This is one of the first of the great publishing houses to recognize the importance of high-pressure gas in connection with their large printing plant.

A more important extension that is about to be carried out is in a southerly direction—viz., the New Bridge Street approach to the newly-widened Blackfriars Bridge. The bridge is at present lighted in a very efficient manner by forty of Sugg's high-pressure upright burners at 10 inches pressure, giving a duty of 30 candles per cubic foot, or 300 candles per burner; the burners being supplied direct from the Beckton high-pressure main in the immediate vicinity. Owing, however, to the discovery of a high-pressure inverted burner, capable of using the gas at 54 to 70 inches pressure, it has been decided to relight the bridge in this manner. The services have already been tested for the new pressure; and though they have been in use for nearly nine years with high-pressure gas, they have stood the test. Advantage has been taken, during the construction of the bridge works, to extend the main round the new widened portion of the Embankment to light the staircase approach to the public passenger subway, and bring the main across the Embankment by the London County Council boundary to link up with the New Bridge Street main, so as to get a return flow over the bridge from the Southwark end back to the City, where formerly there was a dead-end. The temporary wooden rests that are about to be erected on the new roadway of the northern approach will also for awhile be lighted with high-pressure inverted burners; one of the flame arc lamps on the approach having been already removed. The public passenger subways crossing from the Embankment to the Hand-in-Hand Fire Insurance Office, and from the District Railway Station to the Royal Hotel, will be lighted by gas; inverted mantles being used, and low-pressure gas being supplied.

Anticipating that high-pressure gas will be required at some future time to light New Bridge Street, the Gaslight and Coke Company intend to take the opportunity, while laying their new high-pressure main, to drill, tap, and "tee" it for the necessary lamp services.

Automatic Ignition of Gas.—A French patent has been taken out by MM. Lubeck and Payet for a process and apparatus for the preparation of a compound for the automatic ignition of illuminating gas. According to an abstract of the specification in the "Journal of the Society of Chemical Industry," native hydrated cobalt oxide is mixed with cuprous chloride and heated *in vacuo* to 450° C., and a current of hydrogen or of lighting gas, previously heated to 120° C., is then passed over the mixture. The mixture is treated with hydrochloric acid so as to dissolve the cuprous chloride and precipitate a double chloride of cobalt and copper, or a mixture of hydrated cobalt chloride and copper chlorides, according to the conditions of the heating in hydrogen. The precipitate is allowed to settle on pieces of pumice stone which are afterwards dried. The solution is used for coating a part of the incandescent mantle, and the prepared pumice stone is made into pellets which are fixed near the burner.

THE INVERTED INCANDESCENT GAS-BURNER.

By HENRY O'CONNOR, F.R.S.Edin., Assoc.M.Inst.C.E.

[A Lecture delivered before the Irish Association of Gas Managers, Aug. 10.]

That this type of burner is the reverse of scientific will be gainsaid by no one. Gas, being lighter than air, tends to rise; heat also rises, for the same reason. Flames burn upwards; and yet in this burner we try to reverse all the laws of Nature. But (and this is an important part of the matter) we get the result required by this means—namely, the maximum of the light in a downward direction. With the ordinary upright incandescent burner we get no direct light at all immediately underneath; and if we had not the light coloured ceilings and walls to reflect the light, we should find darkness below the burner. This brings us to consider the advantages of light walls and ceilings in making the average light in a room of an even and regular quantity, which cannot be done without these reflecting agencies.

Of recent years there has been a tendency to increase the amount of light considered necessary for all purposes; and this is no doubt owing to the cheapening of the lighting agent through the introduction of the Welsbach incandescent mantle. It has, however, been accompanied by a desire to clothe the ceilings with papers having more or less pronounced patterns upon them, in place of the older method of whitewashing. These papers will absorb in many cases as much as 40 or 50 per cent. of the light thrown upon them; and this quantity absorbed is a complete loss to the general illumination of the room, as, with the newly whitewashed ceiling, 80 or 90 per cent. of the light thrown upon it is reflected in various directions. The heavy shadows are thus removed, and a softer and more even lighting is secured. This is specially advantageous with the upright burner, which radiates as much as 50 per cent. of its light above the horizontal. Such burners, in fact, give their maximum effect in a horizontal direction; and therefore we shall require to reflect this if we wish the light for reading or working purposes, which is usually required below the level of the light. Hence the walls must also be of a light colour. Orange coloured paper only reflects 55 per cent., green 10 to 46 per cent., pale red 16 per cent., brown 15 per cent., deep chocolate will only give out 4 per cent. of the light thrown upon it. Æsthetics may demand "dirty greens" and dull colours; but if we want "light, more light," we must keep to pale and light colours.

The next matter of reflection to be considered is the globe. One of the best for transferring the horizontal rays to the vertical was the "Holophane" globe, manufactured on the prismatic principle, after the type of the lighthouse lenses. These globes effectively spread the light in the downward direction. They were, however, necessarily rather expensive to manufacture, and have gradually fallen somewhat out of favour. The advent of the inverted burner also rendered them less advantageous; but there are many opal globes now in use which do not reflect the light in the best direction. The ordinary opal globe with the clear glass at the lower part has its sides too steep. They should be at 45° with the horizon, and not 60° or 70° as is usual. The light would then be directed downwards, through the clear glass portion instead of outwards, where the opal portion of the globe obstructs their direct radiation.

The inverted burner, in contradistinction to the upright, gives 76 per cent. of its light below the horizontal—its maximum being at about 30° below it; while directly underneath there is some 80 per cent. of the maximum light radiated in any one direction. This is, of course, rendered possible by the mantle being fully exposed in this direction without the interposition of any part of the burner. This leads to the placing of all or most of the burner over the flame, and in many cases results in the obtaining of a less quantity of light than might be possible from the gas consumed. To get the best effect from the burning of a gas of any composition, a definite quantity of oxygen is required to combine with the carbon and hydrogen contained in the gas; and this is necessarily accompanied by the proportion of nitrogen (say, 79 per cent.) contained in ordinary air.

To find out the quantity of air required to ensure complete combustion, we must know the percentage of H, CH_4, and CO. We can ignore the CO_2 and N, as these do not require oxygen and are not combustible. It is interesting to see what the quantity required will be with (say) a coal gas and a water gas, as these will illustrate the considerable differences between gases of different compositions. First, with a coal gas having a composition of (say) 53 per cent. of H, 37 per cent. of CH_4, and 5 per cent. of CO, and taking 100 feet as the quantity of gas to be used, we shall require for the H one-half the volume of O to form H_2O, as there are two volumes of H to one volume of O in the mixture; so that 53 cubic feet of H require 26·5 cubic feet of O. For the CH_4, we shall want twice the volume of O, or 37 cubic feet; CH_4 requires 74 cubic feet, because the C requires twice the quantity of O; and the H_4 requires 2 O. Thus the combination requires 2 O. For the CO, half the volume of O is required to form CO_2, or 5 cubic feet of CO require 2·5 cubic feet of O. Thus 100 cubic feet of a gas of this composition require 103 cubic feet of O. Now when air is used as the source of this O, the percentage of O contained in it is only 21 by volume; so that we shall need to make a rule-of-three sum to find the air required. Thus, $\frac{103 \times 100}{21} = 490$ cubic feet of air necessary for 100 cubic feet of the gas, or 4·9 cubic feet of air for each cubic foot.

Taking a carburetted water gas as containing 35·6 per cent. of H, 17 per cent. of CH_4, and 28 per cent. of CO, we shall find that this requires: For the H, 17·8 cubic feet; for the CH_4, 34 cubic feet; and for the CO, 14 cubic feet (65·8 cubic feet in all), or 100 cubic feet of gas require 65·8 cubic feet of O. $\frac{65{\cdot}8 \times 100}{21} = 313$ cubic feet, or 1 cubic foot of carburetted water gas requires 3·13 cubic feet of air for complete combustion.

The 4·9 cubic feet of air will thus consist of 1·03 cubic feet of O and 3·87 cubic feet of N, and the 3·13 cubic feet of air of 0·66 cubic feet of O and 2·47 cubic feet of N; and this N has a cooling effect upon the flame, as it has to be heated and passes away carrying this heat, which might otherwise be used to give heat to the mantles. If the air is still further weakened by the addition to it of carbon dioxide (the result of all combustion of carbon) and water vapour (from the combination of the H of the gas with the O of the air), the proportion of oxygen is still further reduced, and the flame is cooled to a greater extent. This happens with many of the inverted burners now on the market, as the products of combustion—which are principally nitrogen, carbon dioxide, and water vapour—pass up round the air-holes of the bunsen burner, where some 3½ times of air is required to mix with the gas to get the best effect. This air is only drawn into the burner by the issuing gas, and, consequently, if the air is contaminated, a less quantity of oxygen is mixed with the gas in the primary combustion, and the green inner cone (which is to be seen when the proper proportion is obtained, and which gives a maximum heat of some 3220° Fahr.) is absent, and a lilac inner cone only is found, when the maximum temperature is probably only some 3080° Fahr. The light given by a mantle is greatly increased by a rise in the temperature of the flame to a much greater extent than is represented by the increase of heat; only a small percentage increased heat giving a large percentage of increased light. This is obtained by making the flame smaller for a given consumption of gas; and despite this reduction of size, the intense flame, when fitted with the proper size of mantle, gives out a greater amount of light.

It cannot be too often repeated that when complete combustion occurs only a given quantity of heat can be evolved from a given quantity of gas—say, on an average, 600 B.Th.U. per cubic foot, whether a bunsen, flat-flame, high-pressure, or blow-pipe flame is used; and the size of the flame varies inversely as the intensity. So that the greater the intensity of the flame, the smaller it is. We can calculate the number of B.Th.U. obtainable if we know the composition of our gas; and taking again the coal gas as containing 53 per cent. of H, 37 per cent. of CH_4, 5 per cent. of CO, 4 per cent. of C_nH_{2n}, we have:

For the H,	53 ×	326·2	= 17,288·6
,, ,, CH_4,	37 ×	1024	= 37,888
,, ,, CO,	5 ×	323·5	= 1,617·5
,, ,, C_nH_{2n},	4 ×	2377·0	= 9,508
			66,302·1

or (say) 663 B.Th.U. per cubic foot.

If we have the carburetted water gas as before, we have:

For the H,	35·6 ×	326·2	= 11,612·72
,, ,, CH_4,	17·0 ×	1024	= 17,408·00
,, ,, CO,	28·0 ×	323·5	= 9,058·00
,, ,, C_nH_{2n},	14·6 ×	2377	= 34,704·20
			72,782·92

or (say) 728 B.Th.U. per cubic foot.

For the C_nH_{2n}, 2377 B.Th.U. per cubic foot has been taken, as if the whole were propylene (C_3H_6).

With increases of pressure of air and gas, there is practically no limit to the heat obtainable by a gas-flame; hence the very high duty of 60 candles per cubic foot which is obtained by the Keith high-pressure burners, where the gas is compressed to about 54 inches of water, or nearly 2 lbs. per square inch.

No inverted incandescent gas-burner is complete without regulators for both air and gas; so that the flame can be adjusted to exactly fit the mantle and keep the filaments in the hottest part of it, which is the outer envelope where the carbon monoxide is combining with the oxygen of the air and forming CO_2. Otherwise the mantle must be the exact size of the flame, which latter will vary with the pressure and quality of the gas, and is, consequently, difficult to fit. The regulator of the gas requires to be as near as possible to the outlet of the gas in the bunsen burner; so that the full pressure of the gas is available to cause the inrush of air—the ordinary tap only serving to reduce the quantity of pressure, and thus reduce the injecting effect. The regulation should be capable of delicate adjustment, and the air-passages be designed to allow easy travel for the air; so that there is no stoppage at all of flow. As before mentioned, the intake should be below the outlet for the products of combustion. With such precautions it should not be difficult—and, in fact, has been proved to be possible—to obtain as high a duty as 39 to 41 candles per cubic foot of gas consumed. The greatest fault with most of the regulators on the market is that the cone does not occupy the exact centre of the hole through which the gas issues; so that the air induced with the gas is not evenly mixed with it, and the heat of the mantle is not even throughout. The difficulty which the maker of the regulator experiences is that the heat is playing on

it while in use, and, consequently, when the regulation has to be changed, if it be delicately fashioned, it is fixed, and cannot be moved.

As regards heat evolved by burning gas, we may take it that, with an average gas, each cubic foot will give us some 600 B.Th.U., representing 600 lbs. of water raised 1° Fahr. As air has a specific heat of 238, the 600 B.Th.U. would raise (say) 2521 lbs. of air the same extent. One pound of air equals 13·1 cubic feet; so that the 2521 lbs. equal 33,025 cubic feet. If, then, we divide this figure by the cubic contents of the room, we get the rise in degrees. Taking the room as containing 1000 cubic feet, we should get a rise equal to 33° Fahr. But as we should change the air at the rate of 1200 cubic feet per hour for each person (and ventilation has to be allowed for at least two or three persons), the quantity of air to be heated is much more than the contents of the room, and the rise in temperature should not exceed 5° Fahr.

Many people think that the larger the mantle the greater the light. This is not necessarily the case, and with many burners the larger mantle reduces the candle power. I have had burners submitted to me to test with extra-large mantles, and have only obtained about 15 candles per cubic foot with them; whereas with the same burner and a smaller mantle, I have obtained as much as 39 candles per cubic foot of gas consumed. There is no doubt that the exposure of the mantle to the oxygen of the air deteriorates it, as does also dampness; so that it is important to know when purchasing mantles that they have been recently made, and that old stock has not been palmed off upon one. The coating of collodion also tends to reduce the incandescence at the time of first burning off. It would be better if we could do without this coating; but then the mantle would not stand the shocks and jars of travelling.

The principal argument in favour of the lower candle power gases is that a rich gas requires more air, drawn in for primary combustion, than a poor one; and as (as has been already remarked) this air is only drawn into the burner by the ingoing gas, it is clear that a smaller quantity of the richer gas has to draw in a larger quantity of air. This can only be possible with higher pressures, which are not always available. The best light is obtained when the air and gas are regulated to give a violent ebullition or popping when starting; this will become silent in about 5 minutes, when the burner is heated up and the slight excess of air (which caused the noise) has been reduced, owing to the heating of all the parts of the burner.

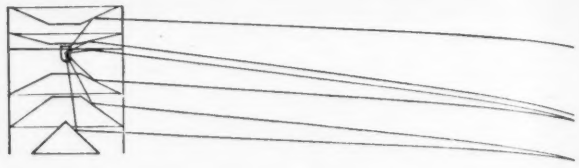
In view of the frequent employment of inverted incandescent burners for street lighting, some remarks regarding their use in this connection may not be out of place. We must first consider what is required for the best lighting; and there is no doubt that an even illumination over the whole surface of the road is what is most desirable. We want this light, not to read a newspaper laid flat on the road surface, but to enable us to see any obstructions which may appear. Hence the fact that light varies as the cosine to the normal of the ray of light, does not, in my opinion, enter into the question.

If, now, we consider that our lamps are fixed 60 yards apart and are 10 feet high, we shall find that the angle at which the greatest light is required is 6·36° below the horizontal, so that the most light may be shed in the direction of the road, midway between two lamps. Dealing, then, with the direct light only from the burner, which would be shed on a surface normal to the ray, and neglecting, for the reason above stated, the light on the surface of the road, we have a comparative distance of 90 ft. 6 in. to the point midway between the lamps, as against 10 feet from the lamp to the ground immediately under the light, or a difference of illumination of 82 to 1. If we desire a direct light from each lamp of 1-40th candle foot, making in all 1-20th candle foot as the light from both sources, we shall require each of the burners to give 205-candle power at 6·36° below the horizontal, and in a vertical direction only 5-candle power.

Now it is quite evident that our burners cannot give this light without some alteration of the light at present sent from an inverted incandescent burner, which is, roughly, equal at all degrees below the horizontal, but which is slightly greater at about 30° below. A concave reflector, which would serve to direct all the light radiated from a burner above 5° below the horizontal, would have to be of such a shape that, if we try to use this light, we shall have a number of reflected reflections, each with its loss of power (because no reflecting surface will give out all the light shed upon it), as the edge of the domed surface, on the opposite side, will obstruct the direct reflection in the required direction. Consequently, we must forego some of the more horizontal rays to utilize a greater number of those at higher angles; but even then we cannot get much benefit from these rays.

Then, again, for the light in a direct downward direction we may use some of this to reflect outwards, to come somewhat nearer the required light at the point midway between the lamps. At first sight, it would appear that a reflector of a curved cone pattern would best serve the purpose, placed on the bottom of the lamp; but further examination will show us that the point of the cone will come too near the mantle and be affected by its heat, so that some other form will have to be adopted.

I have shown in the diagram a suggestion for reflectors to utilize the rays, in both the upward and downward directions, which are not needed, if we desire an even illumination of the area. The light rays for the portions directly under the lamp, and up to 55° below the horizontal, are made to pass through the opal reflectors, and are consequently reduced; while the proportion



which is reflected is used to increase the light projected about the angle 6·36° below the horizontal, where the most light is required. These reflectors have been designed of a true conical form, so as to spread the light somewhat about the spot referred to; but the central rays are in the required direction. The cost of such reflectors is not great, and would tend to a more equal illumination of the area between the lamps than is possible without such aids.

The blackening of ceilings still continues, even with the inverted incandescent burner; and perhaps the remark made to me by an ex-gas manager may illustrate the cause of it, and enable you to convey the cause to your customers. He entered the hall of the offices which I then occupied, and, seeing the wall was very dirty above a steam-heated radiator, remarked "What dirty gas you have here." There was no gas within 20 feet. The dirt had been deposited on the condensed moisture, due to the cooling by the wall of the rising current of heated air, which, when so cooled, could not carry the same amount of aqueous vapour which it could when hot. He was, however, quick to recognize that the cause of this was exactly the same as the blackened ceilings over gas-lights, which the general public believe is due to dirty gas. His remark illustrates very clearly that these dirty ceilings are due to the cooling effect of the ceiling depositing the moisture which the hot air carries, and this moisture collects all the dust particles which are supported by the air. Thus the ceiling gets brown, and finally black if not attended to.

The PRESIDENT moved a vote of thanks to Mr. O'Connor. The lecture had been a very instructive one, and one which would be beneficial to all of them.

Mr. R. G. SHADBOLT (Grantham) asked to be allowed to second the vote. There was more in the lecture than they could appreciate at the moment. It was one which appealed to him, and which represented, to his mind, an immense amount of very useful work. In regard to street lighting—which, in itself, was a subject well worthy of the attention of the Association—the question of refracting the lights of the street-lamps was one which, he must confess, was very little understood. They often talked about illuminating power and illuminating effect; but he was afraid there was very little interest taken in lighting effect as Mr. O'Connor had put it before them. The predominating thought in his mind was, how was it—why was it—that they always dealt in regard to these matters with the effect which they obtained from the gas, whereas the gas was, to some extent, a foreign element? Why was it they never dealt, or attempted to deal, with the result they got from the air that they used? He thought Mr. O'Connor would agree with him that if they approached the subject from this point, they were driven very rapidly to a certain conclusion. He once heard it said in a discussion on the subject by a gentleman who objected to what he termed low-grade gas, that if the arguments adduced in favour of low-grade gas were logical, they ought to go on to a non-illuminating gas, and obtain from it the best lighting. This gentleman's remark, taken logically, was very near the mark, because it was an undoubted fact that the easiest method to obtain the best result from an incandescent mantle was by means of the non-illuminant constituents of the gas; and when they went into the question of what air was required to consume a heavy or a light gas, they came to this question—what was the best duty they could obtain from a cubic foot, or 100 cubic feet, of gas? If they approached the subject from the point of view of the non-illuminant constituents of the gas, they would find that, with the non-illuminant gases, they would obtain, per cubic foot of air consumed in their combustion, a duty of from 25 to 26 per cent. higher illuminating power for every cubic foot of air consumed than they would with a heavy hydrocarbon. This suggestion from the lecture they had just listened to had gradually obtained possession of his mind during the lecture. Taking the records from the beginning to the present time, they would find that they did not contain a more useful lecture than that which had just been delivered.

Mr. O'CONNOR thanked the meeting for the attention which they had given to his lecture, and also for the kind remarks that had been made regarding it. Mr. Shadbolt referred to the question of the quantity of air, or, if he understood him rightly, the amount of light to be got from a certain quantity of air, rather than the amount of light from a certain quantity of gas. The difficulty they had in this was that air was practically always the same; but, unfortunately, gas was not always the same. He did not say it varied from day to day, because gas managers were constantly watching the gas to see that it was of the same quality; but it varied in different towns. In this particular connection, he would like to call Mr. Shadbolt's attention to a very curious point. Taking carburetted water gas, which was about 30-candle power, so far as he could remember, and giving 728 B.Th.U. per cubic foot, and coal gas, which was about 16-candle power,

and giving only 663 B.Th.U., the gas with the higher heating power required a less quantity of air, and the gas of the lower quality, and lower heating power, required a greater quantity of air. It was not a question of high-grade or low-grade gas, it was a question of the constituents of either, or both, of these gases. This was what they had to look at; and it was a matter which a great many people lost sight of. He thought that the commonly expressed opinion in the South was that it was between three and four candles difference. He had tested Scotch gas (a gas made from a common kind of coal); and he found that the difference was only two candles. His point was this, that it was not the difference between the high-grade gas and the low-grade gas which caused the difference, but that it was the ingredients of the gas made in Scotland, and the ingredients of the gas made in London, because most of the Scotch coals, gas coals especially, were on the borders of the cannel coalfields, and therefore they partook much more nearly of the quality of cannel; and the gas made from them had a number of hydrocarbons of an entirely different nature to those which were found in the 15-candle gas which was made in England, from coals from the Newcastle and Durham districts. This was the reason for the difference; and he thought the figures he had given would illustrate it.

Mr. SHADBOLT asked leave to explain that Mr. O'Connor did not seem to see the matter from the point of view which he did. He simply raised a question as to the duty to be obtained from a given quantity of air in the case of non-illuminant gases. Mr. O'Connor referred him to his tables, and said how the results obtained from carburetted water gas, which was of higher illuminating power, and required less air than ordinary coal gas, differed from those obtained from coal gas which contained a larger proportion of the heavy hydrocarbons, and which, in combustion, gave a lower duty than they obtained from a non-illuminant gas. What he wished was to get the difference in the duty obtained from the air consumed with luminous and with non-luminous gases.

CREOSOTE FOR WOOD PRESERVATION.

In the portion of the speech of the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter), at the recent half-yearly meeting, in which he dealt with the subject of residual products, he remarked that, owing to timber becoming scarcer, it was found necessary and economical to creosote railway sleepers, &c., and thus prolong their life. This statement is verified by an article in the current number of the "Journal of the Franklin Institute," in which it is stated that more than 56 million gallons of creosote were used in preserving timber in the United States last year. These figures are based upon reports made to the Forest Service by 44 firms operating 64 timber-treating plants. Assuming that, on an average, one gallon of creosote will protect a cubic foot of timber from decay, more than 100 million cubic feet of cross-ties, piling, poles, mine, and other timbers were given a treatment that will greatly increase their life and usefulness. Never since timber treating began on a commercial scale in the United States has the domestic supply of creosote been equal to the needs of the industry. With the rapid development of wood preservation in recent years, the insufficiency of the home production of creosote has become more marked. In 1908, 69 per cent. of the creosote used by the treating plants was imported, and only 31 per cent. obtained from domestic sources. Nearly three-fourths of the imported creosote comes from England and Germany, some is obtained in Nova Scotia, and some in Scotland and Holland. The domestic creosote used by the treating plants was obtained chiefly in New York, Philadelphia, and other large cities.

Were all the tar produced which the coal annually coked in the United States is capable of yielding, it would distil as much creosote as is now used by the wood preservers. Unfortunately, American operators do not even get the fullest use of the limited quantity of coal tar made; for it does not pay the operators to distil it for creosote alone. Consequently, unless they can find a market for the associated products, it is not separated. Germany has gone far ahead of the United States in the development of coal-tar products, and her exports of them to America are steadily increasing. Ten years ago, the strongest advocates of the creosoting method of preserving wood could scarcely have hoped for the present advanced state of this industry. Formerly the production of creosote, from both coal tar and wood tar, far exceeded any demand for wood-treating purposes. The number of wood-preserving plants has, however, grown so rapidly within the last four years that America is not able to supply its own demand for creosote.

We regret to record the death on the 17th inst., at Purley Bury, Sanderstead, of Augustine Aglis, third son of Mr. W. J. Dibdin, F.I.C., F.C.S., in his 25th year.

According to one of the appendices to the report of the Principal Chemist of the Government Laboratory (Dr. T. E. Thorpe) on the work carried on there in the year ended the 31st of March last, 18,060 gallons of industrial methylated spirit were used in the manufacture of mantles for incandescent gas lighting, compared with 16,888 gallons in the preceding twelve months.

PRODUCER GAS FOR PUMPING-ENGINES.

In the "JOURNAL" for the 15th of June (p. 727), we gave a paper, on "Working Results of Pumping-Engines Operated by Producer Gas," read by Mr. D. HASTINGS IRWIN at the annual meeting of the Association of Water Engineers. The following are some of the observations to which the paper gave rise.

Mr. ALFRED TOWLER (Leeds) said he should like to know whether the 300 H.P. named early in the paper was brake or indicated or the nominal horse power, and, whatever it was, how it was ascertained. It would also, perhaps, be simpler if the costs were reduced to per 1000 gallons of water raised 100 feet high. He made out that this would appear as 1·62d. and 0·228d. He should like to know if the brake horse power given was actually determined on the site, because, of course, if it was determined in the works it did not necessarily mean that when they were working with their producer on the site their conditions would be precisely the same. With reference to the comparative results given as between steam-engines and gas-engines, he took it that the two were doing the same work. He should like to know the age and condition of the steam-engines. If they were performing the same work, the steam-engines were doing about 31 million duty—an exceedingly poor result. If this were so, was it fair to compare a new gas plant with an old steam-engine plant about to be abandoned? He felt he must take exception to the statement "that the working costs of gas power are considerably less than those of steam power, per brake horse power." With regard to the last example given of a gas-engine direct-coupled to a centrifugal pump, he thought this was an exceedingly good one; and both the gas-engine makers and the pump makers should be very proud of the result. In the course of his paper, the author said that if a gas-engine were more heavily loaded it would give a better efficiency; but in his (Mr. Towler's) opinion, the makers were wise in not loading it more heavily. Had they done so, it might have stuck altogether. To his mind, the great trouble with suction-gas plants had been where they had been loaded too near to their maximum power. They all knew that a steam-engine might be very greatly overloaded, but that at present the overloading of a gas-engine—he meant the capacity for taking a material continuous overload—did not exist.

Mr. EASTON DEVONSHIRE (London), speaking as a practical man interested in the subject, said he felt there was a certain amount of caution to be observed before coming to a decision as to whether suction-gas plant would, in the long run, turn out to be more economical, compared with the best and latest types of steam plants. Of course, one of the considerations would be the cost of fuel in the two cases, which would vary enormously in different localities. In the South of England they were paying for anthracite already nearly twice what they paid two years ago. He saw that at the Waskerley reservoir of the Weardale and Consett Water Company they were able to use three-fourths of coke to one of anthracite; and he hoped that something of the same kind might be done in the plant he was interested in. He gathered that the fuel to be used depended somewhat on the type of the producer. All these considerations were so important and so undetermined, that he thought they must wait for a few years before they could satisfy themselves as to what was to be the most economical means of pumping water under the conditions dealt with in the paper.

Mr. PERCY GRIFFITH (Westminster) said that as the author had referred to a test of which particulars were sent by him (Mr. Griffith), he should like to make a few remarks on the paper generally, as well as on this test in particular. He ought, perhaps, to have (editorially) corrected the author's reference to a "series of tests," as they had not had the opportunity of carrying out such elaborate tests as they would have liked. Those referred to in the paper were taken over a period of twelve hours, in the case of each of the two plants. The whole plant had been in use for twelve months before the trial was made, and the water had occasionally had a great deal of sand in it. The pumps had, therefore, been pumping sandy water off and on during a period of twelve months, and were not in a very efficient condition; so that under more favourable circumstances much better results would no doubt have been obtained. With regard to Mr. Graham's design of the plant in use at Woodmansterne, he was very interested in the worm-gearing. The question was the common difficulty associated with high-speed engines driving pumps; and it was interesting to see an example of the latest device for overcoming this difficulty. He believed the results were perfectly satisfactory; but he wanted to ask whether any trouble had been met with in connection with side-thrust. He should like to offer a few observations on the general question of the testing of pumping plants. The point had already been referred to, that tests were generally made under ideal conditions which were not met with in ordinary working. He quite admitted, as Mr. Towler had said, that a new plant was not in an ideal condition for giving the best of results. Everything was what was commonly called "green;" and there was a good deal more friction, both in pumps and engines, during the first few weeks of their being in regular work. Probably the most satisfactory period for a test to be taken would be at the close (say) of some three months' running. But, of course, after this the conditions of wear and tear must get more and more unsatisfactory as time went on. Still, it had been often urged that such special tests taken when the plant was in its most favourable

condition were far from showing the actual working results to be obtained over a period of years, which, after all, was what most of them were concerned about.

Mr. C. Liddell Simpson (London) said he had recently had some experience with gas-engines driving pumps through gear. In one case, a horizontal gas-engine was driving, through a large worm-gear, on to a shaft which drove a set of "concertina" pumps; the power transmitted through the gear being upwards of 100 pump horse power. His firm had made a very careful test, and as the brake horse power could not be measured on the site, it was necessary to get the exact indicated power from diagrams; and the greatest accuracy had to be maintained, so that the indicated horse power should tally with that which had been obtained in the makers' works, where the engine had been previously tested. They had not found any difficulty in checking independent sets of cards, working out the indicated power, and getting the results to agree very closely indeed with those which had been previously obtained on trial in the works. This pumping plant was interesting, because one of the largest examples of worm-gear for transmitting the power had been adopted. Of course, with everything new, there was a considerable amount of trouble in getting the running engineers, who looked after the plant, to give the special and close attention which was necessary; and, in the case of a gas-engine driven by suction-gas producers, unless the producers were thoroughly understood and looked after, and the superintendent kept a close eye on the men who were running the plant, there was bound to be trouble. With regard to the suction-gas pumping plant driving a high-lift pump at Woodmansterne which his firm had supplied, the high-lift pumps were driven direct through worm-gear; the shaft being direct-coupled to the gas-engine. His firm had considerable experience with these forms of gear for transmitting power, and there was no doubt they gave very good results in running, and were very efficient.

The President (Mr. R. Askwith) remarked that one or two points in connection with the gas-engine had struck him very much, and one was the similarity of the working costs they had had laid before them. The Waskerley engine had cost, in fuel alone, 0·11d. per 1000 gallons lifted 100 feet. Mr. Griffith gave 0·12d. It was very interesting, when they took into account the different costs of fuel in various places, that these figures should be almost dead-level. At Waskerley, they were using a mixture of three of coke to one of anthracite. The coke cost 10s. 6d. per ton, and the anthracite something like 42s. per ton delivered at the engine-house. The average price, therefore, came out at 18s. 4½d. per ton. They could run the engine for a considerable period upon coke alone, but for the fact that it fluxed, and the bars of the generator got choked. They found that, mixing in this proportion, the fluxing did not take place, and the generating plant was not injured. In giving the figure of 0·11d., he might say they simply took a year's running. He thought the amount debited against the engine for fuel during the year was affected by the fact that they closed the pumping, and shut-down rather suddenly, because heavy floods came, and partly filled the reservoir into which the water was being pumped, and made it no longer necessary to pump; and they had a good deal of fuel left on hand. He believed that if they had weighed the unused fuel, and credited it, the cost would probably have worked out at 0·10d., which was lower than any others quoted. This seemed to him to be entirely accounted for by the fact that they had a suitable coke manufactured in the locality. They obtained it from Messrs. Pease and Partners, Limited, who screened out a special size for them—walnut size—and it answered their purpose admirably.

Mr. Irwin, in reply, said he quite admitted that the main question with the producer plant was the first cost of the fuel. Anthracite had gone up considerably in price of late years, owing to increased demand due to extended use of producer plants. But any gas plant which was originally designed to work with anthracite could be used with gas coke. It was, however, necessary to see that there was sufficient margin of power in the engine, as the output of the engine was reduced by about 7 per cent. if gas coke was used instead of anthracite. The 300 H.P. engine which he had mentioned was originally worked with gas made from anthracite. When he visited the plant some months after it had been started, he suggested to the owners that they should use gas coke, as it was only about one-third the price they were paying for anthracite. There was a sufficient margin of power in the engine to allow of making the change, and therefore it was carried out, with very beneficial results so far as working expenses went. The gas plant itself required no alteration. He had listened with interest to the President's remarks, and thought if he was using gas coke free from tar there ought to be no difficulty with it.

The President: It was not the tar that was the trouble, but the iron contained in the coke.

Mr. Irwin went on to say that the quicker a gas-engine was run, the less would be its first cost in pounds sterling per horse power; but he quite agreed that it was advisable to keep the speed as low as possible. Mr. Towler had raised the question as to how the 300 H.P. was ascertained, and wanted to know whether the consumption of 1½ lbs. of gas coke was per indicated or per brake-horse-power. He had pleasure in informing him that the consumption was taken on the brake-horse-power; it was calculated on the average working expenses spread over a number of months. The question had been raised as to the class of fuel which could be used in producer plants. As a matter of fact, at the present time his firm had gas plants working on anthracite, bituminous slack, peat, cotton-seed refuse and cotton cake, and even on leather refuse from boot making; also on charcoal. There were plenty of producer plants working on this fuel in India, Burma, and China, as well as in Australia. In the last-named place, there were gas plants working with sheep's wool, and even with sheep's fat; so that the catalogue of fuels suitable for producer plants was a fairly comprehensive one. It was true in the past there had been difficulty in starting large gas-engines; but now that compressed air had been generally used, this drawback had disappeared, and they could be started quite as reliably as steam-engines. The question of overload could easily be arranged by putting in a sufficiently large engine in the first place, and by not regularly working it up to its maximum output. The working expenses at Woodmansterne could be reduced by using coke instead of anthracite, providing there was a sufficient margin of power in the engine to allow of them doing this. In reply to Mr. Griffith, on the subject of the best method of testing the gas consumption in an engine, he (Mr. Irwin) was of opinion that a counter fixed to the head of the engine gas-valve, in conjunction with the speed-counter recording the number of revolutions of the engine, was all that was required; and it gave very accurate results. If the engine was in anything like working order, there was little chance of a charge not being ignited on admission to the cylinder. His firm had recently installed a very large high-pressure fire-service pumping plant at Winnipeg, consisting of four 500 H.P. and two 250 H.P. gas-engines, each driving by gearing a set of three-throw vertical double-acting piston-type pumps. The larger sets were capable of delivering 18,000 gallons per minute against a pressure of 300 lbs. per square inch; and the two smaller sets 900 gallons per minute at the same pressure. This plant had been recently tested; and it was found that the duty in foot-pounds of work done per 1,000,000 B.Th.U. consumed was, in the 250 H.P. sets, 211,516,500, and in the 500 H.P. sets 177,246,250. The thermal efficiency ratio per indicated horse power in the smaller sets was 0·481, and in the larger sets 0·294; and the thermal efficiency per water horse power was 0·271 in the smaller sets and 0·277 in the larger. The mechanical efficiency of the pumping units was 83·1 and 77·5 per cent. respectively. Since the paper had been read, Mr. B. W. Bryan had pointed out that the figures given of the Tendring Hundred Water-Works test were not all quite correct. The tabular statement should be as follows:—

Water horse power	57·50
Total head	402·00 feet
Consumption of anthracite per water horse power	0·88 lb.
Cost per water horse power	0·1460d.
Cost per 1000 gallons lifted 100 feet high	0·0749d.

FIRE RISKS OF ELECTRIC LIGHTING.

The oft-asserted claims of safety of electric lighting in respect of causation of fire have been again refuted by statistics which are quoted in a recent number of the "Journal für Gasbeleuchtung" by Herr F. Schäfer, of the German Continental Gas Company of Dessau. The figures that he gives are from an official report of the Statistical Department of the Prussian Ministry of Agriculture relating to the fires which have occurred in Prussia in the years 1906 and 1907. The damage caused by fires proved to have arisen from different modes of lighting is shown in the appended statement for the two years, as well as the total amount of damage which, in addition to that of which the cause was proved, was in all probability due to the same agents.

Damage Resulting from Fires in Prussia.

Cause of Fire.	Cause Proved.		Cause Proved or Conjectured.	
	1906.	1907.	1906.	1907.
Electrical faults	£9553	£60,937	£77,012	£151,497
Gas for lighting, cooking, or heating	9818	17,425	23,146	17,880
Petroleum	32,726	36,550	37,536	41,353

These figures are most instructive, as they show that in the year 1907 much more damage through fire was proved to have resulted through electricity than through gas and petroleum together; and this notwithstanding the far wider use of gas than of electricity. The figures also show that the rules for securing the safety of electric lighting promulgated by the Association of German Electricians, of which so much was expected in the way of diminution of damage by fire, have not been instrumental in arresting the continuous increase in the losses caused by fires arising from electrical faults.

Bonding new and old concrete can be accomplished in the following manner, according to a paragraph in "Engineering Record." Clean the surface of the old concrete with clear water and a stiff broom. Apply a mixture of one part of hydrochloric acid and three parts of water with a brush, making several applications one after the other. Then scrub the surface with clean water and a stiff brush until all the acid is washed away and the surface is perfectly clean and free from loose particles. While it is still wet, apply the fresh concrete, and keep the new concrete damp for at least a week; being careful not to allow it to become dry at any time.

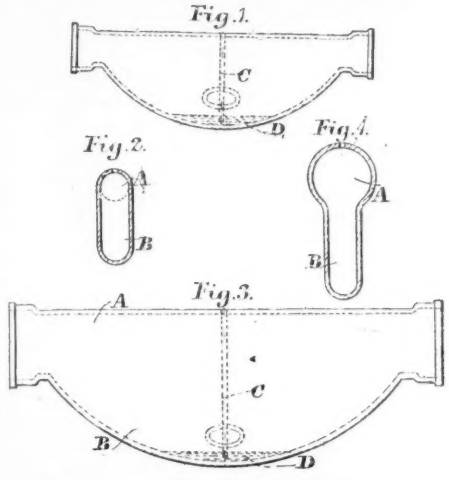
REGISTER OF PATENTS.

Syphons or Catch-Boxes for Gas-Mains or Pipes.

BELTON, J. C., of Chester.

No. 18,542; Sept. 4, 1908.

This syphon or catch-box is made in the form of a "fish-bellied" pipe of cast iron, having (say) a socket at each end. The body of the vessel is segmental in longitudinal vertical section and semi-oval in transverse section; its maximum depth being at the centre, and equal to about three diameters of the pipes to which it is connected. The width of the vessel is the same as the diameter of the pipes to which it is connected; and the sides between the semicircular top and bottom are parallel. Immediately in the centre of the top, a "dip-pipe" is fixed and reaches to within about ½-inch of the bottom of the vessel. Provision is made for securing this pipe in the usual manner, so that it may readily be removed for renewal, and that the syphon-pump or stand-pipe may be attached to it for emptying the vessel.



Belton's "Fish-Bellied" Syphon Pipe.

The arrangement was referred to in the "JOURNAL" for June 22, p. 890; so that a brief description of the accompanying illustration will suffice. It shows in figs. 1 and 2 a side elevation and section respectively of a form of the invention applicable to mains of small diameter; while figs. 3 and 4 are similar views of a form suitable for larger mains.

The "fish-bellied" receiver or sump B is formed as a downwardly extending continuation of the pipe A having in longitudinal section a rounded bottom made the same diameter as the pipes forming the main. The dip-pipe C comes to within a short distance of the bottom of the receiver B; so that when the receiver is cleared of liquid (shown at D) there can be very little left in it. In large pipes a heavy and cumbersome casting, with an unnecessarily large volume, would result if the above method were used; so the form shown in figs. 3 and 4 is used, in which the receiver B is of smaller width than the pipe portion A, but is in all other respects similar to the first-described form.

Gas-Engines.

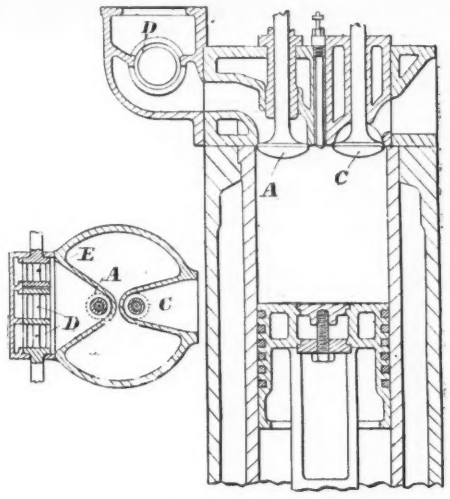
BURSTALL, F. W., of Edgbaston.

No. 21,782; Oct. 15, 1908.

This invention relates to a four-stroke cycle gas-engine of the scavenger kind, in which the inlet valve into the cylinder is also the inlet valve for the scavenger charge, and in which between the gas and air valves and the inlet valve there is a certain space into which the scavenging valve also opens—a type of engine well known. An improved cycle of operations is, however, provided. Arrangements are made for the usual-proportional admission of air and gas during the suction stroke in such manner that the pressure into the cylinder is, as usual, below atmospheric—neither the air nor the gas being under pressure. A fraction of time before the end of the suction stroke, and while the inlet valve is still open to the cylinder, the admission of air and gas to the space and cylinder is cut off (which causes a drop in the pressure within the space and the cylinder), and a second air-valve is opened between the atmosphere and the cylinder and the space. Air thereupon rushes through the valve and the space and into the cylinder, carrying with it the contents of the space; so that they are washed or cleared out into the cylinder, to be used as part of the explosive charge. The air admitted through the second valve is not in any way under pressure; and the opening of the valve may be simultaneous with the closing of the ordinary air and gas valve, or a fraction of time afterwards.

The illustration shows how the arrangement of valves is made—a longitudinal section of the cylinder, and a transverse section to a reduced scale.

The inlet valve to the cylinder is at A; the exhaust valve at C; the combined rotary air and gas valve, to admit the proportionate charge, at D; and the second air-valve (which has two functions—the one to clear the space into the cylinder, and the other to admit the scavenging air) at E. The valve D, as usual in an engine of this type, is under the control of the governor; and the valve E is moved by a half-speed shaft. The valve E is closed while the valve D is open, and open while the valve D is closed. At one time (near, or at the finish of, the suction stroke), it opens to the atmosphere to admit air to sweep the contents of the space into the cylinder, to be used as part of the explosive charge, while it opens for scavenging, on the exhaust stroke, preferably from a space containing air under pressure—it being usual in an engine of this type to use the scavenging air under pressure.



Burstall's Four-Cycle Gas-Engine.

The construction of the rotary valves forms no part of the present invention. They were described in a prior patent, No. 10,444 of 1908.

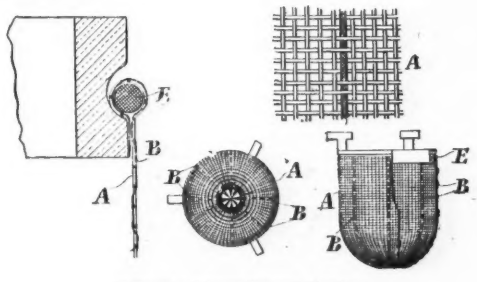
Incandescent Gas-Mantles.

FELLNER, J., of New London Street, E.C. (Partly communicated from OBERFELT AND CO., of Berlin).

No. 5260; March 4, 1909.

According to this invention, a durable mantle is said to be produced by threading through the fabric of the mantle, after it has been impregnated, reinforcing threads which have not only been rendered luminous by impregnation, but have also been hardened. As these supporting or reinforcing threads are produced independently of the fabric of the mantle, it is possible to impart to them any desired degree of hardness (according to the particular circumstances in which the mantle is to be used) by adding to the luminous solution with which the threads are impregnated a quantity of beryllium nitrate and a proportionately greater quantity of didymium nitrate—the exact amount depending upon the degree of hardness to be imparted to the reinforcing threads.

The supporting threads should preferably be attached to the supporting ring or the like carrying the mantle simultaneously with the fabric. In the case of inverted gas-mantles, the threads may be carried up to the upper edge of the fabric and then tied round the carrier ring by asbestos threads. In the case of mantles for upright burners, the supporting threads can be fixed to the upper ring to which the edge of the mantle is fastened.



Fellner's Strengthened Mantle.

As shown, the supporting threads B (of any desired number, length, and thickness) inserted in the mantle A after it has been impregnated, are preferably carried from the upper edge of the mantle into the neighbourhood of the cross threads or spider at the bottom of the mantle. There is no object in carrying the threads through the spider, because this part of the mantle is the least exposed to fracture. In order to fix the mantle and the supporting threads on the carrier ring, the upper edge of the mantle and the threads which extend to it are passed round the ring and fastened by means of an asbestos thread E or the like; "thus affording a good hold for the threads, and effectually protecting the mantle from the effects of vibration."

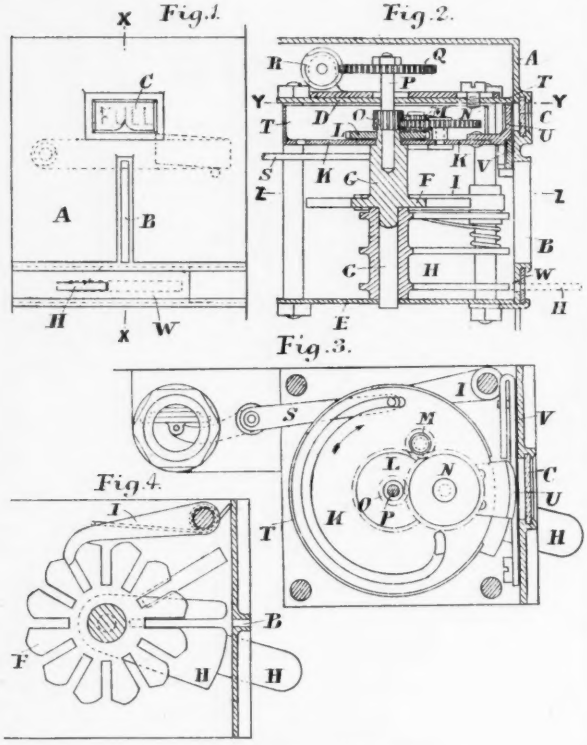
Prepayment Gas-Meters.

CARDELL, C. C., of Birkdale, near Southport.

No. 7305; March 26, 1909.

This coin-freed mechanism of prepayment gas-meters is of the type in which the coin is caused to connect an externally operated handle with the internal mechanism, so that the latter may be set to deliver a predetermined quantity of gas; means (such as interchangeable toothed wheels) being provided whereby the apparatus may be regulated to

deliver different quantities of gas per coin inserted according to the current price of gas.



Cardell's Prepayment Gas-Meter.

Fig. 1 is a front elevation; fig. 2, a vertical section on the line X; fig. 3, a horizontal section on the line Y; and fig. 4, a horizontal section on the line Z.

A is the front of the casing; B, the coin slot; and C, a glazed opening through which the indicator may be inspected. F is a star-wheel fixed to a spindle G, the lower part of which is of reduced diameter and passes through the boss of the coin-carrier H, and is supported in a bearing in the bottom plate. The star-wheel is fashioned with slots, and the carrier H is formed with a slot to receive the coin—the latter being supported upon the bottom plate, in which a discharge slot is formed. I is a spring-actuated pawl engaging with the slots of the star-wheel. The upper part of the spindle G carries a slotted disc K loosely mounted, so as to be capable of rotating thereon, and has fixed to it a toothed wheel L. The disc has mounted on it a pinion M, which meshes with the wheel L and with a toothed wheel N, which is also mounted on the disc. The wheel N meshes with a pinion O fixed to a spindle P, the lower end of which is free to rotate within the upper part of the spindle G, and is supported at its upper part by a bearing in the top plate. The spindle P carries at its upper end a toothed wheel Q, which is interchangeable with others of different diameter, for regulating the quantity of gas to be delivered per coin inserted.

The toothed wheel Q is rotated by a worm R fixed, or geared, to the usual spindle which projects from the meter, and which is rotated by the passing of gas through the meter. The worm is carried by a slidable bracket adjustable to and from the spindle P by means of slots and set-screw, in order to adapt the position of the worm to the different diameters of the interchangeable wheels Q.

The disc K is formed with a slot concentric with regard to the spindle G, except where it becomes eccentric to the spindle for the purpose of opening and closing the gas-valve. A lever or arm S is fixed to the spindle of a valve arranged within a valve-chamber, and carries at its end a pin which enters the slot of the disc K. When the pin is in the concentric portion of the slot (as fig. 3), the valve is held open; and when the disc K has rotated in the direction of the arrow, the pin is guided by the eccentric part of the slot until the valve is shut.

The apparatus works as follows: On a coin being inserted through the slot B, it falls into the slots of the coin-carrier H and the star-wheel F respectively, and thereby interlocks them. The external handle of the carrier H is then moved from left to right, thereby rotating the star-wheel to the extent of one tooth, in which position it is held by the pawl I, and the coin falls through the slot into the till beneath. The movement of the star-wheel is communicated by its spindle G to the toothed wheel L, and through the pinion M and toothed wheel N to the disc K, which is rotated a proportional amount—the pinion O being held by the meter mechanism. The movement of the disc causes the lever S to open the valve admitting gas to the meter, upon which the worm R begins to rotate and work the disc K back to its shut position through the toothed wheel Q, pinion O, wheel N, and pinion M.

Any number of prepayments (up to a certain limit) may be effected by inserting the coins and operating the carrier H; each payment being indicated upon an annular indicator T fixed to the disc K and visible through the glazed opening C. When, however, the last payment of the predetermined limit has been reached, the rotation of the disc K brings a stop U into a position which prevents any further payment until the mechanism has worked back to the extent of one payment. For this purpose a modified form of a known device is used, consisting of a bar or lever V pivoted to the case and normally occupying a position resting upon a stop across the upper part of the coin slot, as shown in figs. 1 and 2; so that the insertion of a coin necessarily raises the bar. When the stop U is in the position shown in figs. 2 and 3, it is visible through the window C, and prevents the rising of the bar V, and thereby prevents the admission of a coin through the slot B.

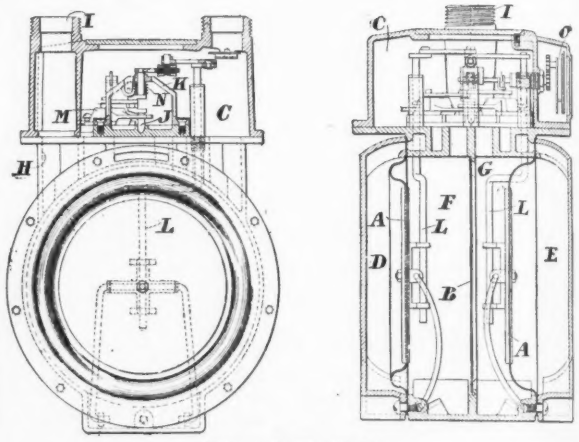
Gas-Meters.

CHRISMAN, H., of Pittsburg, Penn., U.S.A.

No. 7629; March 30, 1909. Date claimed under International Convention, May 4, 1908.

This invention relates particularly to meters comprising a plurality of aligned measuring chambers and in which reciprocating diaphragms are employed which are actuated by the gas passing through the meter and which in turn operate the distributing valves and the registering apparatus of the meter. The object is to provide a meter which shall be simpler and cheaper to manufacture than those hitherto employed, and "adapted to protect more effectively the mechanism of the meter from interference or injury by unauthorized persons."

The meter consists of an exterior casing formed in four distinct parts—a body portion, two side covers, and a top cover. The chamber enclosed by the body portion and the two side covers is divided into four measuring chambers by two reciprocating diaphragms and a stationary partition. The top cover encloses the distributing chamber from which gas is delivered to each of the four measuring chambers, and it is also provided with the main gas-inlet port and main gas-outlet port, which respectively communicate with the gas-main and the gas-distributing system. The delivery of gas to and from the four measuring chambers is controlled by two slide-valves within the distributing chamber and actuated, in conjunction with the registering apparatus, by the reciprocating diaphragms.



Chrisman's Gas-Meter.

The diaphragms A and the stationary partitition B form the four measuring chambers referred to. Each chamber communicates with the distributing chamber C by means of a passage formed in the walls of the meter body, and through which it receives and delivers gas. The chambers D E communicate with the chamber C through passages, each of which extends through the body portion. The chambers F G, which are similarly located between the diaphragms and the stationary partition, communicate with the distributing chamber through passages formed in the body portion. An exhaust chamber communicates with an exhaust port I formed in the top cover, by means of a tubular duct integral with the top cover, and which projects down into contact with the body portion.

A vertically disposed crank-shaft J is journalled at its lower end in a plate, and at the upper end in a frame K. The valves, the crank-shaft, the frame, and the reducing mechanism for the registering apparatus are all secured to the valve seat plate—an advantageous arrangement, for the reason that the valves are more easily adjusted than would be the case if each valve had an independent seat. Less difficulty is also encountered in maintaining the alignment of the reducing mechanism than would be the case if the frame were independently secured to the body portion. The crank-shaft is rotated by the flag-wires through the agency of flag arms and flag arm links. One flag arm L is secured to the upper end of each flag wire, and a flag arm link is pivotally secured to the outer or free end of each arm. A tangent arm is rigidly secured to the crank-shaft J, and is provided with a standard adjustable longitudinally of the arm and to which the links are pivotally secured.

The distributing valves M are simple "D" or slide valves, which reciprocate on their seats and alternately connect each measuring chamber with the distribution chamber and the discharge chamber. Each valve controls the delivery of gas to, and the discharge of gas from, the two measuring chambers on one side of the partition B, and is reciprocated by the crank-shaft J, through the agency of a valve link pivotally secured to a pin or lug formed on the valve. Each valve is provided with bifurcated projecting arms, which co-operate with a screw so as to maintain the valves in proper alignment during their reciprocations. The flag-wires are so arranged that the crank-shaft will never be dead centred. One measuring chamber is always open to the gas pressure within the distributing chamber C.

A pawl is pivotally mounted on the frame portion K, and, engaging the tangent arm at each revolution, prevents the meter being operated in the reverse direction. The gas-inlet port is provided with a shield secured to the top cover adjacent to the port, and so located as to pre-

vent the operating mechanism being tampered with by the insertion of wires or other instruments through the port opening.

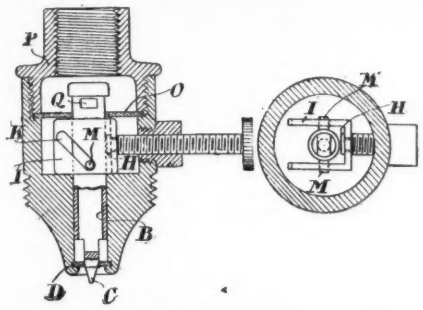
A worm gear N, provided on the shaft above the crank arms, and a wheel meshing with the worm and mounted on a shaft journalled in the frame K, constitute the reducing mechanism of the registering apparatus O.

Gas-Nozzles for Inverted Burners.

GRAETZ, M., of Berlin.

No. 8149; April 5, 1909.

The object of this invention is to effect the fine adjustment of inverted gas-burners by means of a screw while retaining the positive operation of the regulating organ. Another object is to avoid the one-sided operation associated with eccentrics and other similar devices. A construction embodying these two features consists in a yoke surrounding the regulating pin and provided with inclined slots in which pins engage fixed to the regulating pin; the yoke being adapted to be moved crosswise to the axis of the regulating pin by a screw. The regulating pin is preferably formed hollow, and is provided at its upper end with an opening arranged above a plate through which the hollow pin passes. In this way, the plate acts as a baffle-plate to catch any solid particles carried over by the gas, and the gas (freed from dust) passes through the opening to the interior of the hollow regulating pin.



Inverted Burner Nozzles.

In the accompanying cross section through a nozzle provided with such regulating means, and a plan view of the regulator, the nozzle body is provided with a central opening through which there slides the hollow regulating organ B, at the end of which there is a pointed pin C adapted to enter a plate D arranged at the lower end of the body. The regulator B is provided with two side pins M, arranged diametrically opposite, and projecting into, inclined slots K arranged in a yoke I. With the yoke there engages a screw G, provided with a shoulder H so that the screw may move the yoke positively in either direction. The screw fits in a nut arranged in the nozzle. The yoke is guided between the bottom of the hollowed-out chamber in the body and a plate O, held in position by the nipple P, which screws into the body. Above the plate there is arranged in the walls of the regulator B a port Q. The upper end of the regulator is closed by a cap.

With this device gas enters the nipple P from above, and impinges on the plate O. The regulator B is illustrated in its furthest-in position—that is to say, the pin C practically fills the opening in the plate D, and the pin M is at the bottom of the inclined slot K. In this position, the port Q in B is above the plate O, so that all dust carried over by the gas settles on the plate, and the gas free from dust passes through the port Q. This arrangement therefore dispenses with the necessity of a sieve.

To regulate the nozzle opening, the screw is rotated so as to draw the yoke I (say) from left to right. With this motion, the pins M rise in the inclined slots K and produce the required adjustment.

Leak-Indicating Gas-Meters.

DEZENDORF, R. L., of Richmond Hill, New York State.

No. 9866; April 26, 1909. Date claimed under International Convention, May 20, 1908.

This invention has for its object to provide means for quickly indicating whether or not any gas is passing through the meter, "even though the amount may be very small." It is said to be particularly useful in detecting leakage, which, "in the meters now used, can only be detected after a considerable period." The patentee observes: "Thus, when a meter is installed, the requirements are that the person installing it shall not leave it until he is sure that all the connections are tight, so that there is no leakage. If there is a small leakage, it may happen that, on account of the back-lash or lost motion in the registering train, no indication of such leakage will be given on the dial for a considerable period. Furthermore, the movement of the train is so slow that unless the leak is large, it is very difficult to detect it. It frequently happens, for these reasons, that the person installing the meter is compelled to wait a quarter-of-an-hour, or longer, in order to determine, by observing the indicating dial, whether the pipes and fixtures are tight. Furthermore, it is very difficult for anyone to detect small leaks in the fixtures or piping throughout the house, such as are very liable to occur at the stop-cocks and joints. By my improvement, the fact as to whether there are any leaks at or beyond the meter can be readily detected, since the slightest flow of gas produces a perceptible indication within a very short time."

Fig. 1 is a front elevation of a meter embodying the suggested improvement—one of the lower sections being opened by the removal of the front plate. Fig. 2 is a plan view of the meter with the top removed. Fig. 3 is a view of the case in section, and showing certain parts within the case in elevation. Fig. 4 is a detail.

The meter casing has the usual front and back sections, each of which contains a disc B, with the flexible diaphragm C and guide-wires C^1. Connected to each disc are posts D, to which is pivoted the flag E, rigidly secured to its flag-wire F. The flag-wires extend upward through stuffing boxes to the gallery of the meter. Connected to the flag-wires are flag-arms G G^1—G being the upper arm and G^1 the forearm in each instance. These arms are connected at H to the tangent I, which forms a part of the crank-shaft J. The crank-shaft bears the worm K, which meshes with the gear L driving the index-shaft M of the registering train N. The crank-shaft passes into the valve chamber O, and operates the valves P in it. Q is a dog carried by the bridge and engaging the tangent so as to prevent any backward rotation of the driving mechanism.

Fig. 1.

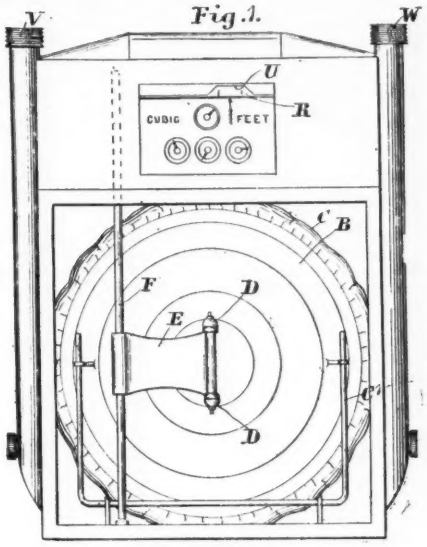


Fig. 2.

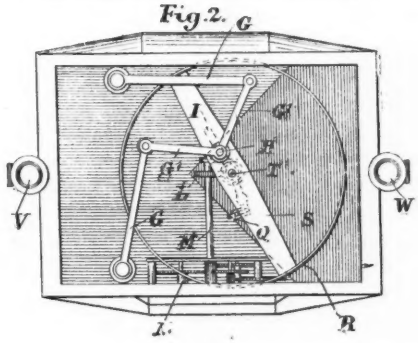


Fig. 3.

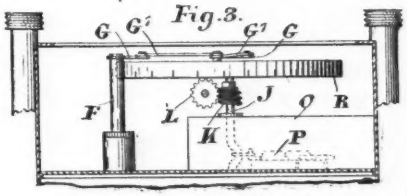
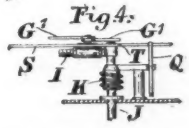


Fig. 4.



Dezendorf's Leak-Indicating Meter.

The parts thus far described are "the parts of the standard meter, which has been in common use for many years." To a rapidly moving part of the driving mechanism of this meter the patentee proposes to connect an indicator, preferably describing a circle having a diameter substantially equal to the depth of the meter casing. It is made in the form of a circle R, the connection being effected by a cross-bar S, secured to the crank-shaft J by (say) a screw T, so that the indicator moves in a horizontal plane. The cross-bar may be also secured rigidly to the crank-shaft or tangent I. This indicating circle R rotates behind an opening U, which (for convenience) is placed above the indicating dial of the registering train, so that a portion of it is visible through the casing. It is rigidly connected to the driving mechanism of the meter "and, therefore, eliminates any danger of lost motion;" so that any movement of the driving mechanism of the meter is at once communicated to the circle R. The driving mechanism of the meter always moves at a rapid rate relative to the movement of the shaft M, or any portion of the registering train—the shaft J making fifteen revolutions to one revolution of the shaft M. The large radius of the indicating circle R causes a point on the periphery of the circle to move over a hundred times as fast as any portion of the registering train, and any movement of the operating mechanism is, therefore, easily and quickly detectable by observing the indicator R.

This "quickly moving indicating surface" R is shown connected to

the crank-shaft of the meter, and that is the form preferred. In this form, it should be concentric with the axis of the shaft J. It can, however, be connected to any other moving portion of the operating mechanism within the gallery, so long as "lost motion can be sufficiently eliminated and sufficient speed secured."

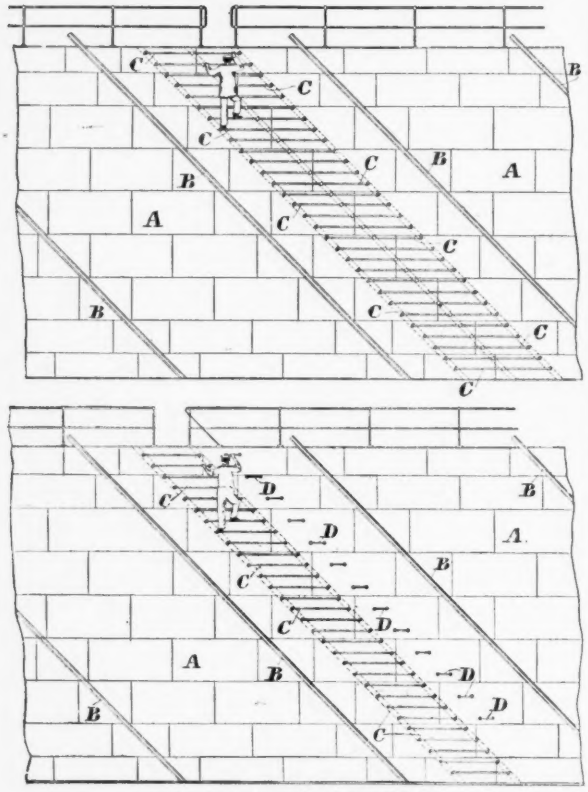
In operation, gas enters the inlet V and passes to the outlet W in the usual manner, causing the diaphragms to reciprocate and the flag-wires and arms to oscillate, so as to turn the crank-shaft J. The slightest movement of the operating mechanism at once moves the graduated indicating circle R in a horizontal plane; and this movement is readily detectable through the opening U. "By this means, as soon as the meter is connected and the gas is turned on, it can be at once ascertained whether there is any leakage on the outside of the meter, either in the coupling or in the fixtures through the house."

Ladders for Use with Spirally-Guided Gasholders.

WRIGHT, H. F. (C. & W. Walker, Limited), of Donnington, Salop.

No. 9483; April 21, 1909.

This inventor applies to the lift a ladder composed of rounds or treads, horizontally disposed but arranged in a series at such an angle, or sideway inclination, as will not be intercepted by a guiding rail. The treads may be applied direct to the sides of the lift, or to side members set diagonally at the required angle instead of vertically. They are of so much greater length than the treads of ordinary vertical ladders as to give the requisite safe footing and handhold for men ascending and descending.



Wright's Ladders for Spiral Holders.

The illustrations show parts of a lift A of a spirally-guided holder to which ladders, in accordance with this invention, are applied. In the first arrangement, the rounds or treads constitute also the handholds; while the second shows a ladder with supplemental handholds fixed to the lift at the side of the ladder. In both figures, B are guiding rails, set spirally as usual. The ladder is made up of treads C, of greater length than is usual with vertical ladders and set sideways of each other in an upward and downward direction; so that they form a diagonally arranged series extending from the lower to the upper part of the lift without any obstruction from the spiral guiding rails B.

In the second illustration, the treads are of less length than those shown in the first one, and are supplemented by handholds D fixed in convenient positions and at suitable intervals along the side of the ladder.

The Explosion at the Hanley Gas-Works.—In the House of Commons last Tuesday, Mr. William Thorne asked the Home Secretary what had been the result of his inquiries with reference to the explosion that took place on the 19th of July in one of the purifiers at the Hanley Gas-Works. Mr. Gladstone replied: I have received a report with regard to this explosion, from which it appears that the purifier in question was last emptied on the 9th of March of this year, and that three quarters of an hour intervened between the lid being lifted and the men entering the purifier. It would appear that a longer interval should have been allowed; and I am arranging for further inquiries to be made as to the practice at other works, and into the subject generally. I may, perhaps, add that the Inspector informs me that 54 purifiers have been dealt with in the same way during the last two years at the Hanley Gas-Works without any mishap.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Dr. Bueb's Experiments on Coal Gasification in Verticals.

SIR,—The very interesting experiments of Dr. J. Bueb, described in his communication, on "The Procedure of Gasification in Vertical Retorts," in your issue of the 10th inst., deserve special attention as confirming in every detail the results of previous investigations on the subject. I think, however, some of Dr. Bueb's conclusions should not go unchallenged; and I, therefore, ask you to be allowed some space in your columns to critically examine this contribution to the problem of carbonization.

That, indeed, the conditions obtaining in a vertical retort were truly reproduced in the experiment described is very much open to doubt. The simple fact that the piece of coke was so inserted in his porcelain tube as to be a good fit, constitutes an enormous difference from the conditions in the retort, where (according to his own observation and general experience) the charge stands-off the wall of the retort at a considerable distance, and presents innumerable cracks and passages for a ready escape of the gas.

The gas—more especially during the early hours of high make, characterized by high pressure—will have a sufficiently rapid rate of flow to pass through these open spaces fast enough to avoid assuming the temperature of the surfaces with which it comes in contact, or to materially suffer from the heat radiating from them. Now, the thermal decomposition of the gas is to a large extent dependent on its rate of flow—a fact which recently has again been so ably demonstrated by Mr. R. Forbes Carpenter. If, therefore, the rate of flow is impeded by forcing the gas through the fine pores of coke only, the conditions are vitally altered from those in the retort.

By this, however, I should not like by any means to infer that a decomposition of the gas liberated from the coal does not take place to a considerable extent. The liberal formation of scurf in intermittent vertical retorts, which has been objected to at various times, would readily disprove such an assumption. I rather suggest that the principal sufferers from the influence of the heat must be those very heavy hydrocarbons which are, firstly, more liable to decomposition, and, secondly, owing to their higher specific gravity, would not travel at the rate of the specifically much lighter hydrocarbons which constitute the coal gas proper. As I must necessarily infer from the available data that Dr. Bueb's experiments were carried out with purified coal gas, free from tar, taken from the laboratory tap, I think his results cannot apply to the real conditions. If it were possible to collect the crude distillate from coal from some point within the charge, and cool it without any change in its chemical composition, and then reheat it in the manner described, I feel certain it would still contain a percentage of illuminants larger than that required in practice, although it would have deposited carbon freely.

I believe that the question of the travel of gases can be brought nearer its solution by positive observation rather than by negative arguments; and the best object-lesson for the former is a close and continuous study of the coke produced. Its structure at various points in the charge is so characteristic that a good deal can be deduced from it by ordinary physical considerations.

If, indeed, the gases would travel through the core of the charge during the whole of the carbonizing period, I should be interested to obtain from Dr. Bueb an explanation as to the formation of bubbles of tar coke in the centre of the charge.

R. LESSING.

Laboratory, 317, High Holborn, W.C., Aug. 21, 1909.

Effect of Motor Traffic on Gas-Main Joints.

Mr. T. Webb, the Manager of the Slough Gas Company, writes: "I shall be glad to know if any of your readers are experiencing trouble with their mains owing to the very heavy motor traffic on the roads; for I find that the vibration from this traffic is seriously affecting our joints. Can any of your readers suggest anything effective to meet the difficulty?"

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Private Bills Royal Assented.

On Monday last week the following Bills received the Royal Assent by Commission: Aldershot Gas and Water Bill, Alliance and Dublin Consumers' Gas Bill, Ammanford Gas Bill, Blackwood Gas Bill, Bungay Water Bill, Clevedon Water Bill, Derwent Valley Water Board Bill, Donington Water Bill, Eastbourne Gas Bill, Frimley and Farnborough District Water Bill, Gaslight and Coke Company Bill, Gas Orders Confirmation Bills (Nos. 1 and 2), Gas Provisional Order Bill, Grantham Water Bill, Harrogate Gas Bill, Heywood Corporation Bill, Lisburn Urban District Council Bill, Llanelly Water Bill, Local Government Provisional Orders (Gas) Bill, Mountain Ash Urban District Council Bill, Musselburgh Gas Order Confirmation Bill, Northallerton Water Bill, Oldham Corporation Bill, Pontypool Gas and Water Bill, Pontypridd Water Bill, Prestatyn Urban District Council Bill, Risca Urban District Council Bill, St. Andrews Water Order Confirmation Bill, South Staffordshire Water Bill, Stourbridge and District Water Board Bill, Swinton and Mexborough Gas Board Bill, Wakefield Corporation Bill, Watford Urban District Council Bill, West Gloucestershire Water Bill, Worksop Water Bill, York Town and Blackwater Gas (Electric Lighting, &c.) Bill.

MISCELLANEOUS NEWS.

LIVERPOOL UNITED GAS COMPANY.

The Half-Yearly Meeting of this Company was held at the Offices, Duke Street, Liverpool, last Tuesday—Mr. H. WADE DEACON in the chair.

The report and accounts for the year ended the 30th of June showed that the sale of gas produced a revenue of £514,377; the rental of meters and stoves came to £16,020; residuals yielded £101,854; and the total receipts were £632,859. The expenditure on the manufacture of gas was £398,384 (coal and oil costing £283,240, and repair and maintenance of works and plant £60,099); on distribution, £56,969; on management, £21,317; the contributions to the officials' superannuation fund and the Company's moiety to the superannuation of old officials came to £4840; and the total expenses were £518,070. The balance of £114,789 was carried to the profit and loss account. After deducting the amount taken for the dividend declared in February and interest on the debenture stock, there remained a balance of £59,409, out of which the Directors recommended the payment of a dividend for the half year of 5 per cent. on the consolidated "A" stock, and 3½ per cent. on the 7 per cent. "B" stock.

The CHAIRMAN, in moving the adoption of the report and accounts, referred in feeling terms to the death of Sir Edward Lawrence, who had been a member of the Board for upwards of 33 years, during some 24 of which he was Chairman. Sir Edward's long connection with the Company and his great knowledge of its affairs, together with his genial personality, combined to make him a Chairman in whom everybody had confidence, and for whom all had the greatest respect. Until the last his genial presence was always welcome and inspiring to the Board; and, personally, he should always look back upon his association with Sir Edward in connection with the Company with feelings of the kindest regard. Turning to the report, the Chairman said he was glad to be able to inform the shareholders that the Company had sold practically the same quantity of gas as in the previous year. Comparing the results of the Company and those of other towns, it was gratifying to know that all these places had suffered more than they in Liverpool had done. Bad trade coupled with other causes had undoubtedly had a depressing effect on the consumption of gas. But in spite of this, they had a considerable increase in the number of users; and this was a very satisfactory point. The Board had experienced considerable difficulty with regard to the supply of cannel. Owing to the lamentable disaster at the Maybole Colliery, which supplied them with the bulk of their cannel, their supplies were cut off; and it was, for a time, very hard to maintain the high standard usually observed. Arrangements, however, had been made so that no difficulties would arise in the future. Dealing in detail with the accounts, the Chairman remarked that the cost of coal showed a small decrease of about £1600, and there was a considerable decrease in wages at the works, due to the policy which the Directors had pursued in improving the apparatus. This policy was beginning to bear fruit, and the main aim was still to lower the cost of production. The increase in their rates and taxes was very serious. In two years they had gone up between £5000 and £6000, which was nearly ½d. per 1000 cubic feet sold. Altogether in rates and taxes they paid upwards of £30,000 a year, which meant something like 2¼d. per 1000 cubic feet of gas. The income from the sale of gas was £4000 less than in the previous year. This was to some extent due to the fact that the price to users of prepayment meters had been reduced by 2d. per 1000 cubic feet. There was an increase of £477 in the rental of meters, and also of £203 in the rental of stoves. There was a serious decrease in the returns from residual products, amounting to more than £9000. The Board had made special efforts to promote the sale of coke locally, and they thought everybody in the city ought to use Liverpool coke. As far as they could, the Company would do their best to prevent outsiders sending coke from other towns. It was much more natural that they should sell Liverpool coke in Liverpool than that people should use coke sent from Manchester, Birmingham, Sheffield, or anywhere else. The total revenue for the year was £632,859, and the expenditure amounted to £518,070; leaving a surplus of £114,789. After deducting the amount taken for payment of the dividend declared in February, and interest on debenture stock, there remained a balance of £59,409. The Directors, after careful consideration, had come to the conclusion that it would not be possible for them to reduce the price of gas; but, on the other hand, they had decided not to increase it.

Mr. J. LISTER seconded the motion; and it was unanimously adopted.

It was then resolved to declare a dividend for the half year ended the 30th of June of 5 per cent. on the ordinary consolidated stock, and of 3½ per cent. on the 7 per cent. stock.

The retiring Directors (Sir William Forwood, Mr. Alfred Fletcher, Mr. James Lister, and Mr. Thomas Case Morris) were re-elected; Mr. Burton W. Eills was reappointed Auditor; and the proceedings closed with a vote of thanks to the Chairman.

SHEFFIELD UNITED GASLIGHT COMPANY.

Half-Yearly Report and Accounts.—Proposed Reduction of Illuminating Power.

In opening their report for the six months ended the 30th of June, which will be presented to the proprietors at the ordinary general meeting of the Sheffield United Gaslight Company on the 6th prox., the Directors state that, bearing in mind that the sale of gas in the half years to June 30, 1907 and 1908, showed increases of 9·33 and 6·59 per cent. respectively, they hardly anticipated that, in the present state of trade, the rate of consumption would be maintained. They are, therefore, gratified to be able to report that instead of a falling off, as might have been expected, there was an increase of 1·23 per cent. in the quantity of gas sold in the period covered by the report, compared with the corresponding six months of last year. The advantage to the Company of the lower price of coal, which cost £8366 less, has been entirely nullified by the reduced receipts for residuals, which show a falling off of £8559. The profit on the half year, including interest on the reserve fund investments, amounts to £38,681. To this must be added the balance brought forward; making a total of £119,524 from which to pay the interest on the debenture stock and the dividend. There will then remain a balance of £74,767 to be carried forward.

The accounts accompanying the report show that the sale of gas in the half year produced £104,110, the rental of meters and stoves came to £9347, residuals brought in £63,968, and the total revenue was £178,574. The expenditure on the manufacture of gas amounted to £108,861 (coal costing £68,175, and repair and maintenance of plant £20,683); distribution, £14,895; and management, £6587; rents, rates, and taxes came to £9979; and the total expenses were £141,890. The balance carried to the profit and loss account is £36,684.

At the conclusion of the meeting, an extraordinary general meeting will be held for the purpose of obtaining the sanction of the shareholders to an application to the Board of Trade for a Provisional Order, to be confirmed in next session, for the following purposes: "To modify the apparatus for testing the quality of the gas supplied by the Company, and to reduce the standard for the illuminating power thereof to 14 candles; to authorize the holding of ordinary meetings of the shareholders annually instead of twice a year as hitherto; and to permit debenture stock to be offered for sale by tender as well as by auction, the Company's powers allowing for sale by auction only."

CROYDON GAS COMPANY.

The Half-Yearly Meeting of the Company was held on Friday, at the Offices, Katherine Street, Croydon—Mr. CHARLES HUSSEY, J.P. in the Chair.

The SECRETARY (Mr. W. W. Topley) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

GROWTH, AND WORK OF THE DISTRIBUTION DEPARTMENT.

The CHAIRMAN, in moving the adoption of the report and accounts, said the half year under review had been, save for the effect on the Company of the prices of coal and of coke, to which he should allude later, a rather uneventful one. The growth of the undertaking had been of a steady and satisfactory nature. Measured by the increase in sales of gas (2·50 per cent.), it had not been so large as they had often had in the past; but this increase, compared with that of many of their neighbours, was a good one. This half year suffered in comparison with a year ago by the extra day in 1908 as leap year. Also the weather in the early part of the winter was relatively mild; and it was a matter of common experience with gas companies that to stimulate the output of gas-fires in winter, they required cold weather in the early part of the season. Later on, people—while realizing the comfort which the possession of a gas-fire would give them—were often inclined to defer installing one till the next winter. Similarly, in the early days of summer, a continued spell of hot weather would lead to a rush of orders for gas-cookers, while a cold early summer, such as they had had this year, tended to induce consumers to hold over their installation to another year; and heat such as had recently been experienced produced only vain regrets on their part. Still, the output of stoves (which represented for the half year an increase of 1400 on the number in use) bore testimony to the excellent work being done in the distribution department and to the good results of the lectures on gas cookery which had been given, coupled with the canvassing work that had been done. When they remembered the regrettably large number of empty houses still in the borough, the increase of 823 in the number of consumers should not, he thought, be deemed unsatisfactory.

RESULTS AND ANTICIPATIONS.

A glance at the accounts with which the proprietors had been furnished would show that the marked features of the half year were, on the one hand, the lessened cost of manufacture, and, on the other, the reduced receipts from residuals. The first was due largely, of course, to the lessened cost of coal; but it was only fair to the very excellent work done in the manufacturing department to tell the proprietors that the improved results at the works had materially contributed to this satisfactory result. The very depressed state of the coke market was the counterbalancing factor; and it would be seen that one about offset the other. The receipts from gas were less by some £3000; and this was due to the reduction in price which took place at Michaelmas last. The actual money gain to the consumers was greater than this, and amounted to over £5000 for the half year. Practically, the reduction in gross profit was accounted for by the lessened receipts from the sale of gas. Contracts for both coal and oil over the coming twelve months had been made on favourable terms; and though the gain from this source would, he feared, be lessened by the still very poor prices of residuals, the Directors hoped, if the prices of coal and oil continued low, they would be in a position before very long to announce a still further reduction in the price of gas.

COAL STOCKS.

It would be noticed that the stock of coal in hand was a very large one. This had been intentionally done as a measure of precaution in view of the very unsettled state of affairs in the mining industry brought about by the Coal Mines (Eight Hours) Act culminating in the recent threat of a general strike. It was hoped, however, that these troubles were now in course of settling down; and that the heavy stocks of coal could soon be with safety reduced. It would be readily understood that it was essential to hold a sufficient stock to ensure the uninterrupted supply of gas.

CO-PARTNERSHIP.

The charge under the heading of co-partnership, which first appeared in the accounts last half year, represented the balance of the first year's

bonus which had been credited to the Company's employees, practically all of whom were, he was glad to say, enrolled under the scheme. A feature of the working in their case, which the proprietors would, he was sure, agree with the Directors in regarding as very satisfactory, was that since the agreements of service had been signed in January last, the amounts deposited by the employees with the Trustees, or saved from their wages and salaries during the six months, exceeded the whole amount of the bonus for the period by about 30 per cent. He should much like to mention here a very graceful act that was performed by the Co-Partnership Committee at their first meeting, when—on behalf of the co-partners generally—they spontaneously asked the acceptance by the Directors of the bust of the late Sir George Livesey which was now on the table; and he should like also to take this opportunity of acknowledging how very greatly the Directors appreciated the cordial feeling which this indicated on the part of the co-partners. It was proposed to place the bust of Sir George (who was the pioneer of co-partnership in the gas industry) in the Board-room as a memento of the adoption of co-partnership by this Company.

FREE MAINTENANCE.

It would be seen from the report that a modification was about to be made in the system under which the Company undertook for consumers the maintenance of incandescent burners. The improvements effected in gas lighting by the development of these burners, both in efficiency and in decorative effect, placed gas easily at the head of all methods of artificial illumination, whether as regarded quality of the light (which had been not inaptly described as "artificial sunlight") or its cost, which was now about one-eighth of that of electric lighting by the lamps ordinarily in use, or one-third of that by the most efficient of the expensive and fragile metallic filament lamps. The fullest benefit and economy to be derived from the use of these burners could only be obtained if they received from time to time the attention they required—mainly clearing out the dust that settled on the burners and impaired their action. Recognizing this, the Directors had for some years undertaken this work for consumers at a fixed price, which had been little more than sufficient to cover the cost of the materials used. Now they proposed to give the attendance absolutely free; and they were encouraged by the experience of other companies who had recently adopted this practice to believe that a largely increased proportion of the consumers would soon avail themselves of the service. This he mentioned as one instance only of the many directions in which gas companies to-day rendered, free of charge to their customers, services which were not needed in the past; and as indicating the growing importance of a strong and well-organized distribution department such as the Directors were pleased to feel that the Company possessed. One further matter he might allude to in this connection. The Company were now offering to fix to consumers' meters free of charge pressure-regulating governors, with the option after trial of purchase, or rental at low rates; and consumers who had these installed would soon find the benefits they brought about in an improved and steadier light, and in lessened accounts.

TAR AND LIQUOR SEPARATION.

It would, he was sure, interest the proprietors to know, in view of the rapidly extending use of tar for the treatment of roads, that their Engineer had so arranged the tar and liquor tanks of the new section as to render more thorough the separation of these two residuals, with most satisfactory results both as to the quality of the tar (which was now very highly spoken of by users) and as to the yield of sulphate of ammonia. The latter, it would be seen, although the price had averaged 12s. per ton less than in 1908, yielded an increase of revenue.

FURTHER CHANGES AT THE WORKS, AND THE CARRY-FORWARD.

The net profit of the half year had exceeded the sum required for payment of dividends by nearly £1500; and out of this sum the Directors had placed £500 to the renewal fund. This was to meet the charges which would have to be borne upon the reconstruction of the workmen's club house and mechanics' shops. The former, which stood as it did when the works were first erected some forty years ago, occupied space which would form part of the coal-store of Nos. 1 and 2 retort-houses, when their reconstruction was completed; and it was proposed to shortly erect for the use of the men a suitably equipped building in a more central part of the works. A like course would shortly be taken with regard to the mechanics' shops; and the space they now occupied would be utilized to effect much-needed improvements in the stores. After paying the dividends, the carry-forward was increased from £5589 to £6552, or practically by £1000.

The DEPUTY-CHAIRMAN (Mr. Thomas Rigby) seconded the motion, remarking that he agreed with the Chairman that, under the circumstances, the report was an exceedingly good one; and he would go further, and give it as his opinion that it spoke well for the future. He had no doubt the result in the coming half year would be quite satisfactory to the proprietors.

The motion was unanimously carried.

Mr. WILLIAM CASH proposed the declaration of the dividends at the following rates per annum: On the "A" stock 14½ per cent., "B" and "C" stocks 11½ per cent., "D" stock 5 per cent., and "E" stock 10 per cent.—all less income-tax. He remarked that the dividend had been thoroughly well earned. Compared with a year ago, they had added £344 to the carry-forward; had introduced co-partnership, which had cost the Company £1244; and they had effected a reduction in the price of gas. The Directors were satisfied with this; and he believed the position would commend itself to the proprietors.

Mr. PERCY H. HALL seconded the motion; and it was unanimously adopted.

VOTES OF THANKS—CONSOLIDATION OF STOCKS.

Mr. MARTIN TAYLOR moved a hearty vote of thanks to the Chairman and Directors.

Mr. A. W. OKE, in seconding the motion, observed that the Directors had been well-advised in having a somewhat large reserve of coal. He was glad to see the Board were looking so well after the consumers, and also that they had adopted the system of free burner maintenance. While they were doing this, they also looked after the proprietors—not only in regard to their dividends, but in warning them against (he might call them) worthless imitations of gas companies. It was unfortunate that innocent investors in gas companies, and motor companies too, were flooded with circulars from unscrupulous persons, advocating investment in these concerns. Some small undertakings might be successful; but in the majority of those to which he was referring, the people who invested in them never saw their money again. The proprietors were pleased to hear of the happy results of the introduction of co-partnership.

Mr. DYER desired to support the motion, in order to give him an opportunity of expressing his satisfaction with the balance-sheet, and with the introduction of co-partnership, and to refer to one or two other matters. One thing that struck him, in reading his paper that day, was as to the uncertainty of the position in the coal world. He feared there would be trouble at the commencement of next year over the eight-hour business; and therefore he thought it would be wise not to reduce the stocks of coal, but, if anything, rather increase them. Another matter that, in his opinion, would be of advantage was the consolidation of the Company's stocks. Besides facilitating work in the office and dealings in the market, it would be better for investment on behalf of the co-partners and for small consumers.

The motion was cordially agreed to.

THE PRESIDENT OF THE INSTITUTION.

The CHAIRMAN, in the course of his reply, stated that the question of the consolidation of the stocks had had the serious attention of the Board. They were fully aware there was an advantage in consolidating stocks—making one class of them. He could assure the proprietors that, at the first opportunity, when the Board thought it desirable to do so, it would be done; and he believed he might say it would be at no distant date. Moving a vote of thanks to the officers, staffs, and workmen, he remarked that they had all put their best service into the work during the half year. Speaking of the Engineer and General Manager, he mentioned that honours had been showered on Mr. Helps. For many years he was the Hon. Secretary of the Southern District Association of Gas Engineers and Managers, and then he was elected President. In June last, he was placed at the very head of the gas industry of the country, when, at the annual meeting of the Institution of Gas Engineers, he was elected President. [Applause.] It was one of the greatest honours that any man could receive in the gas profession; and Mr. Helps had thoroughly deserved it. Their congratulations were held out to him that day. Mr. Caddick—Mr. Helps' right hand at Waddon—was always found at his post, and doing his duty well. Mr. Topley was never better pleased than when hard at work. The same applied to Mr. Anderson, the Assistant-Secretary. Mr. Sandeman continued to show the greatest interest in the outdoor or distribution department. Since he was appointed, the efficiency of the department had improved immensely. The head of the rental office (Mr. Haines) also did his very best.

Mr. SAMUEL SPENCER seconded the motion; and it was heartily carried.

Mr. HELPS, in reply, thanked the Chairman for the kindly terms in which he had brought this resolution before the proprietors, and the proprietors for the gracious manner in which they had received it. He appreciated greatly the remarks that had been made from the personal point of view. As to the work at Waddon, one felt he was moving among friends, and among men who were not working merely for a weekly wage, but because they took a lively interest in the Company. The little presentation the co-partners had made to the Directors was one that had been subscribed for in small amounts. The suggestion came from the men in the first instance; and practically every employee had given his mite towards providing the sum necessary to purchase the bust of Sir George Livesey—the great man who was practically responsible for adapting the co-partnership system to gas companies.

Mr. TOPLEY, in also replying on behalf of himself and his staff, especially thanked the Chairman for his references to those who shared with him the work for which he was responsible. The words that had been spoken of them were in every sense deserved.

WANDSWORTH AND PUTNEY GAS AND COKE COMPANY.

The Lowest Price Gas in London and the Suburbs.

The Half-Yearly Meeting of the Company was held last Tuesday, at the Offices, Fairfield Street, Wandsworth—Mr. HENRY E. JONES in the chair.

The SECRETARY (Mr. Chas. W. Braine) read the notice convening the meeting; and the Directors' report and the statement of accounts were taken as read.

The CHAIRMAN, in moving their adoption, said the most important point for him to observe in his comments on the report was, of course, the reduction in the price of gas to a figure that had attracted the attention of their friends. Only the other day, at a Board meeting, a gentleman addressed him as "Mr. One and Elevenpence." But when he (the Chairman) suggested the probability of the price coming down to 1s. 10d. in the not distant future, there was an end to the friendly levity. The next point was that the Directors did not intend there should be this reduction of price without giving the proprietors the extra dividend to which they were entitled under the sliding-scale. The reduction of the price of gas by 1d. per 1000 cubic feet gave the consumers, in the aggregate, £2269; but the little addition to the dividend which a parsimonious Legislature allowed the proprietors to take in consideration of the reduction, only amounted to about £213. So that the proprietors would see the profits were divided in an extremely unequal and unfair proportion—in fact, in their case, only one-eleventh part went to the proprietors, while the whole of the rest went to the consumers. Another point of great consequence to a gas company was the increase in the sale of gas. It had amounted in the six months to 3·1 per cent. compared with the first half of last year, which, contrasted with their neighbours, was a good record. As would have been seen from the figures he had quoted, the reduction in the price of gas and the increase proposed in the dividend

together represented £2482. He ought to say that there was some little dissatisfaction on the part of the Board that they had not on this occasion earned this extra sum of money. But upon reflection the Directors were somewhat consoled. It would not have looked strictly decent (the Directors liked to preserve an air of propriety in all their transactions) to have made such a reduction in the price of gas—a price that excited the envy and the admiration of their neighbours—and then to have earned the full maximum dividend. Instead of giving them £2482—the amount represented by the reduction and the extra dividend—the accounts only gave them £1900 more; the profit on the half-year's trading having been £13,544, against £11,645 in the corresponding period of last year. So that it would be seen they were really short of the amount required to pay the higher dividend by £352. This amount would be drawn from the balance brought forward; and this would still leave them with the fairly substantial sum of £7046. He should explain that the amount required for dividend was more by (omitting shillings and pence) £426—£213 representing three months' dividend on the new stock; and the remainder the £213 to which he had alluded as being required under the sliding-scale. However, the consumers would not have gas at this price, nor would the proprietors have these good dividends, if the Directors did not look after the capital account. The proprietors would be interested in noticing that only one small item had been added to capital on account of fixed plant and land. This was £518, which was the price of a piece of land near the present works, which would some day be of convenience to the Company. The rest of the capital expenditure (which only amounted to £2811) was for those mains, service-pipes, meters, stoves, and coin-meters and fittings without which they could not accomplish a 3½ per cent. increase in the sale of gas. As to the half-year's revenue, owing to the diminished value of residuals and the reduction in the price of gas, they would not make such a large income by, in round figures, some £900. The receipts for gas were about £600 less; but owing to the extended use of stoves, meters, &c., the rentals reduced the net loss to only £60. Residuals produced £827 less, chiefly owing to the fall in the price of coke; but an increase in tar gave them a little compensation. Inasmuch as they had, despite the reduction of price and the additional sum required for dividend, got to within £300 of the amount of profit required, it would be seen that they had saved something. In fact, they had saved practically the whole of the loss in income by the reduction in the price of coal; and this was what gave them such a good account. The total expenditure was less by £2791; but they had had to pay less for coal by about £3600. Oil also showed a small saving. A feature that was not quite so satisfactory was the carbonizing bill. Here their Engineer must look out very sharply, because wages were much in the air just now. The item amounted to £5021, as against £4625—practically £400 more. Still they had sold an additional 3½ per cent. of gas; so that he did not say the difference was altogether a loss. Nevertheless, their Engineer would have to devote himself to this point, because it was found that, with a suitable charging-machine, their old and revered friend the horizontal retort (to which he had always been attached), when rammed full of coal and worked for longer periods, would produce certain manufacturing advantages. He did not suppose that, in their case, this would save them a large quantity of coal, because they had never been in the habit of wasting coals in the past, so they could not save now what they had not wasted hitherto. With regard to the other points in the management, he need only say that the charges were as nearly as possible level with last year. He considered that last year they were first-rate; so that he was not going to apologize for them now. In a haphazard and somewhat disjointed fashion he had told the proprietors the history of the balance-sheet; one of the most satisfactory features about it being that the Directors were able to recommend an additional ½ per cent. dividend.

The Deputy-Chairman (Mr. T. A. Ives Howell) seconded the motion, which was unanimously adopted.

Moved by the Chairman, and seconded by the Deputy-Chairman, dividends were declared, less income-tax, on the "A" consolidated stock at £8 2s. 6d. per annum, on the "B" stock at £6 12s. 6d. per cent. per annum, and on the ordinary "C" stock at £5 13s. 9d. per cent. per annum.

The Chairman, in moving a vote of thanks to the Secretary (Mr. Braine), the Engineer (Mr. H. O. Carr), their staffs, and the workmen, remarked that their officers were proud of the 1s. 11d. price. Now what their Engineer had got to do was to get the carbonizing wages per 1000 cubic feet down to 1½d., which was all that was going to be allowed by authorities for carbonizing labour in the future. When their officers succeeded in doing this, then they should have their reward.

Mr. E. L. Burton seconded the motion, which was unanimously carried.

Mr. Braine and Mr. Carr having acknowledged the motion,

Mr. Burton proposed a vote of thanks to the Chairman and Directors. He remarked that everybody acquainted with the Company must be fully alive to the fact that the wonderful position it occupied that day was due in large measure to the Chairman. To achieve a price of 1s. 11d. for gas for ordinary consumers was indeed a marvellous record. The South Metropolitan Company were down to 2s. 2d., and had been down to 2s.; but the Wandsworth Company—a much smaller concern—had reduced their price to 1s. 11d. It was a most notable achievement, and reflected the highest credit on the Chairman, Directors, and the staff. He had been comparing the accounts for two or three half years; and he found they stood out in strong contradistinction to many companies—particularly in regard to low costs.

Mr. John Hennell seconded the motion; and it was heartily agreed to.

The Chairman, in his response, said it was gratifying to receive the commendation and appreciation of one so competent to judge as Mr. Burton. There was a further point to which he should like to refer. Just recently, the Directors put up to auction £15,000 of ordinary "C" stock; and they had some question with the auctioneer as to the reserve price that should be put on it. He (the Chairman) had told the proprietors over and over again at these meetings that they did not know the value of their holdings; and the transactions showed that they were throwing stock away. The Board put a strong reserve price on the stock offered by auction; and every shilling of it went. After this, if they could not sell stock at a good reserve price on a future occasion, then they would place it among their own proprietors at a high price. The Stock Exchange quotation for their "B" stock the other day was at a figure that would return to the buyer £4 12s. 3d. per cent.; while in February it was at a price that would return 5 per cent. on the investment. There ought to be no company in London who should be able to sell their stock to bring in as low a rate of interest to the buyer as this Company. Of this he had not the slightest doubt, as there was nothing to touch it.

GAS SUPPLY IN NORTH LONDON SUBURBS.

The Directors of the North Middlesex Gas Company will report to the shareholders at the half-yearly meeting to-morrow that the sale of gas in the six months ended the 30th of June showed an increase of 1,932,200 cubic feet, or 2·1 per cent., compared with the corresponding period of last year; and that, notwithstanding the reduction of 2d. per 1000 cubic feet in the price of gas which took effect as from the 31st of March last, the revenue from gas, meters, stoves, and fittings was greater by £237. The returns from residuals also improved. The accounts show that the sale of 93,008,600 cubic feet of gas produced a net revenue of £16,691; and the total receipts amounted to £20,390. The expenditure on manufacture of gas was £10,107; on distribution, £3253; and on management, £1149—the total expenses being £15,888. The balance carried to the profit and loss account is £4502; and the amount available for distribution is £7111. The Directors recommend dividends at the rates of 5, 10, and 7 per cent. per annum on the preference, original, and additional capital, and the carrying of £473 to the reserve fund. This appropriation will amount to £3665, and leave a balance of £3446 to be carried forward.

The accounts presented at the half-yearly general meeting of the Southgate and District Gas Company last Thursday showed that the sale of gas in the six months ended the 30th of June had increased by 7,986,900 cubic feet, or 12·45 per cent., compared with the corresponding period of the past year. The quantity sold was 72,121,400 cubic feet, and the revenue therefrom was £13,044. The total receipts amounted to £16,269, and the expenses to £12,799; leaving £3470 to go to the profit and loss account. After providing for interest charges and transferring £100 to the insurance fund and £250 to the renewal fund, there was a balance of £5584, out of which dividends at the rates of 5, 10, and 7 per cent. per annum on the preference, original, and additional capital were declared. These absorbed £2731, and left a carry-forward of £2853.

BROMLEY AND CRAYS GAS COMPANY.

A Return to Normal Conditions—Rating Valuers' Practices.

The Half-Yearly Meeting of the Company was held on the 12th inst., at the Offices, No. 156, High Street, Bromley, Kent—Mr. Alexander Dickson in the chair.

The Secretary (Mr. H. W. Amos) read the notice convening the meeting; and the Directors' report and the accounts were taken as read.

The Chairman, in moving their adoption, said it was a relief to find—after the burden of similar duties in the immediate past, by reason of the exceptional, diverse, and important matters then claiming their attention—that the business of these meetings had again resumed its normal character, and that consequently his observations would be fewer, and the dispatch of the business facilitated. He was pleased to be able to say that the accounts were, and (he was sure the proprietors would agree in this) would remain, satisfactory while they continued to provide, as they did concurrently with concessions in price to the consumers, for the continuance of the dividends as before, and enabled the Directors to defray the contributions from revenue for the subsidiary works required for the unification at Bromley of the manufacture of gas for the whole district, which, it would be remembered, he told the proprietors at the last meeting was absolutely essential. He was pleased to add that it was now being expeditiously effected, and would be practically completed before their next half-yearly meeting. To invite the proprietors to follow a detailed comparative analysis of the past half-year's accounts and those of the corresponding period of last year would only tend, he feared, to confuse them, because they would not have the figures of the working of the two separate Companies before them. But he might summarize the results in this way: Owing to the reduction of the price of gas at Lady-day, 1908, by 2d. per 1000 cubic feet in the then Bromley district, a net lesser rental from gas had been received by some £1300. And coke, from lower prices principally, had yielded less by some £1100. Then from other sources, they were benefited by some £600; so that the net income was about £1800 smaller in the total from the causes to which he had referred. Then, happily, their net total expenditure was also less by about a like amount, though only £1000 of the saving accrued from the saving in coal. While many of the payments in last year's accounts in respect of the amalgamation disappeared, the charges for repairs, maintenance, alterations, &c., of works and plant in the present accounts were correspondingly larger. In the end, after making provision for a continuance of the same rates of dividend on the several classes of capital, they carried forward in the balance of undivided profit an additional sum of £50. The balance would now stand at about £2250. Satisfactory as this was, the Directors, of course, hoped in the year now before them to attain to still better things. The Board had succeeded in effecting some favourable contracts for coal for the current year's requirements. It would be remembered that in the last two years they had been using in part Yorkshire coal of the best quality and Durham coal, rich in the yield of gas, and both high priced coals. The results generally were quite satisfactory; and, so long as ordinary Durham coal commanded top prices, it was advantageous to the Company to keep to these collieries. But as prices moderated, it became obvious that Yorkshire coal would have to give place, as the freight charges of the railways were, in the

altered market prices, too onerous, and the relative prices of the special and the ordinary Durham coals would necessitate resort to the latter. The coals the Directors had bought would come from collieries of high repute; and they believed that their modern excellent plant, in combination with the skill, care, and devotion of the officers and employees, would obtain from them the best results they could be made to yield. Common prudence necessitated the provision of coal in stock. The threatening cloud was said to have disappeared. The whole nation hoped it had. But, of course, they had now to use all this high-priced coal before reaping the full benefit of the new contracts. And so, while every penny per 1000 cubic feet represented £1500 per annum on the present consumption of gas, the Directors had decided to make a reduction of this amount as from Midsummer, which would lower the price of gas in the Bromley area to 3s., or to within 1d. of the lowest price the Company had previously reached, and in the Crays section to the actual lowest price at which gas had at any previous time been supplied in that district—viz., 3s. 6d. In the early future, the difference in price would be diminished in accordance with the statutory scale, which provided for a uniform price over the whole district in ten years from the passing of the Act, if not reached earlier; and, as soon as it had equalized dividends and prices for gas, might thereafter be varied as the sliding-scale permitted. Readers of the reports of other gas authorities would have noticed that, notwithstanding the cold and dull spring, there had been little additional gas taken, though the number of consumers had become larger. Their own experience had not been exceptional; the advantage in the old district being counterbalanced by a slightly diminished consumption of gas in one or two public institutions in the other district which had embarked upon schemes of electric lighting not previously available to them. Yet the total make of gas was 209 million cubic feet, against the 210 millions of the two Companies in the like period of last year, which was practically of small consequence. Then, as to one other matter referred to in the first paragraph of the report. The alteration and increase of the assessments of the Company to the local rates was none the more acceptable because unavoidable from time to time if the increasing volume of business was remunerative to any extent. The attempted departure from the principles established in precedent over a long period of years, observable in the method of valuation adopted by some surveyors retained by the local authorities, pointed to the desirability of a combined effort on the part of gas companies, to assess whose properties, not on their structural rent value as in the case of ordinary householder ratepayers, but upon the estimated sum which an adventurer would be willing to give to enjoy the estimated trade profits of the business, less the landlord's outlay in repairs, these valuers were specially appointed every five years, while other property might be allowed to escape revision for a long time, if not altogether, without any such professional re-survey. To drift into practices varied by every new comer, and without a recognized precedent system to define deductions and allowances, would be extremely undesirable, and likely to create many injustices, because of the great expense to individual companies in carrying a contest before the highest tribunals. If an old precedent was to be discarded, the new one should be unmistakably substituted by judical authority, for the promotion of uniform and equitable ratings in these cases of such great technical perplexity. He thought this was all he would remark upon the result of the revaluation. It had practically determined the rating for the period for which the authorities might allow the assessment to stand, or until changes in the position of the Company might suggest to the Board the desirability of asking for a revision.

The DEPUTY-CHAIRMAN (Mr. Bertram H. Latter) seconded the motion.

Mr. J. ARNAUD expressed the view that the invested reserve fund should be calculated half year by half year at the market price of the day.

The CHAIRMAN, on the other hand, thought it was not in their case necessary. The Board had considered the matter; and in view of the fluctuations—depreciations and appreciations—from time to time, they did not see any advantage was to be gained. The purpose for which the fund was applicable was specially restricted, and not imminent; and so the investments were allowed to stand at cost.

Mr. PEILL protested against the way in which the Directors had in the report painted black the rating authority. He thought the authority had met the Company and everyone else in a very fair way, and had dealt with the matter in an impartial manner.

The CHAIRMAN said he supposed he must recognize that the honourable proprietor was speaking somewhat in another capacity. [Mr. PEILL: I am, Sir.] That being so, he would take the opportunity of asking Mr. Peill to read the paragraph of the report as it stood, and to be kind enough not to read into it some of the suggestions with which he had been embellishing it. The Directors had only in the paragraph stated the simple facts for the information of the proprietors, in order that they might know there would in future be some £600 more to pay in rates, and how this arose. The Board had simply told the proprietors that the authorities increased their assessment; and that upon the sustained objections of the Company, it had been substantially reduced, but an increased contribution to the rates of £600 a year was entailed by the Committee's decision. That was stating the result in a modest way, without any insinuation whatever against the authorities. The succeeding clause of the paragraph stated that "these additional imposts, so immediately after the amalgamation, derange the efforts of the Directors in cheapening the sale of the gas." That was, again, a statement of fact. The Company would have to provide now, in the first period of five years out of the ten years in which they were to bring about a uniform price over the whole district, an additional £600 of expenditure which they did not contemplate when they got their Bill through Parliament. As between the Company and the rating authority, the Directors quite appreciated the duty incumbent upon the authority; but the Directors would appreciate it all the more if the authority would be good enough to apply somewhat of the same professional examination and inquiry into some of the other existing assessments from time to time, so that there might be a more general lifting up of those which might be properly so treated, and in that way a more equitable incidence of the rate. The Board appreciated the courtesy of the spirit in which the authorities had, on this and former occasions, met them; but his remarks from the chair that day were engendered from a review of the mode of valuation—the difference between the two valuers resulting from a variation of practice on the part of the authority's valuer, as compared with the precedent all such companies had been observing for the past thirty or forty years.

The motion was unanimously carried.

Proposed by the CHAIRMAN, and seconded by Mr. A. S. GEDGE, dividends were declared at the rates per annum of 6 per cent. on the "A" ordinary stock, of 4½ per cent. on the "B" ordinary stock, and of 5½ per cent. on the "C" ordinary stock, all less income-tax.

The thanks of the proprietors were passed to the Chairman and Directors and to the Chief Engineer (Mr. W. Woodward), the Secretary (Mr. H. W. Amos), the staff and employees generally.

ALDERSHOT GAS AND WATER COMPANY.

Enlarged Responsibilities and Capital Increase.

The Half-Yearly General Meeting of this Company was recently held at the Offices—Mr. A. F. WILSON in the chair.

The GENERAL MANAGER AND SECRETARY (Mr. R. W. Edwards) having read the notice convening the meeting, the report and accounts for the six months ended the 30th of June were presented. It was stated by the Directors that the working in the six months ended the 30th of June had resulted in a surplus of £7880; and after providing for dividends on the preference shares, they recommended a dividend at the rate of £11 19s. per cent. per annum on the "A" shares, £8 19s. per cent. per annum on the "B" shares, and £7 per cent. per annum on the ordinary "E," "F," and "G" shares for the past half year, all less income-tax. They said the weather during the latter portion of the half year had been unseasonable, and had undoubtedly retarded the use of gas, especially for cooking. This, together with the economies still being obtained by the War Department in the adoption of incandescent burners in the barracks, had somewhat affected the aggregate sales, which nevertheless showed on private consumption an increase of 3·8 per cent. The market for residuals had also been depressed; and consequently the revenue under this head was rather lower. The results, however, were satisfactory, especially taking into account the considerable reductions in the price of gas which had operated over the half year, representing a loss of revenue equivalent to nearly £800, or approaching the rate of £1600 per annum. The Company's Bill to confer additional powers had passed through practically all its stages at the date of the report (July 9); and it has since received the Royal Assent.

The CHAIRMAN, in moving the adoption of the report, dealt first with the working in the past half year, and then went on to allude to the increased responsibilities which would devolve upon the Company in the future. He said they had undertaken the supply of gas for a very large territory. In fact, it seemed that for a company such as theirs to be supplying gas to a territory 20 miles distant from the works was nothing out of the way. They at present sent gas into districts 12 and 13 miles from the works without any difficulty; and they did not see why they should not be able to undertake the supply even to the extreme distance he had mentioned. They had also been able to secure for almost the entire portion of the district, with the exception of Aldershot, a monopoly for the supply of electricity. They applied for powers to do this, not with any underhand idea of pushing gas to the detriment of electricity, but only to do honestly and fairly what was intended by Parliament when it granted such monopolies. At the same time, they would be able as a Gas Company to see that what electric light was required and what was really a necessity would be available; and they would make their calculations so that whatever supply was given would yield a fair and reasonable return such as Parliament intended. With this proviso and safeguard, he had no doubt whatever that when the time came they would be able to meet all demands of the prospective electric light community, and at the same time be able to show them that they had not done it to their detriment as a Company. Having referred to the question of consolidating the shares of the Company, the Chairman alluded to the possibility of an increased demand for gas for use in aëroplanes. He said they had reason to hope that the Government would take up the question in a serious manner, and they believed they would establish their aërial headquarters at Aldershot. This, he thought, would be a source of increase in the consumption, because gas would be wanted, and it was available and very cheap in Aldershot. They sold their gas to the Government at a very low rate—much lower than that at which they could get it anywhere else; and he could assure any enterprising manufacturer that if he came to Aldershot he would receive a supply of the cheapest motive power to be obtained anywhere. In conclusion, he acknowledged the assistance the Company had received from local Councils and the Press in connection with their Bill.

The DEPUTY-CHAIRMAN (Dr. F. Stroyan) seconded the motion; and it was carried unanimously.

A vote of thanks having been accorded to the Chairman, Directors, and staff for their able conduct of the Company's affairs,

Dr. STROYAN and Mr. W. T. ROBERTSON acknowledged it. The latter said he should like to thank the staff and their able leader, Mr. Edwards, who, of course, had had to bear a great deal of the brunt of the Bill, which was entirely Mr. Edwards' own in every single detail. The Directors knew what they should like, and their General Manager ably put it into clauses, and finally into the Bill, with the assistance of their lawyers.

Mr. EDWARDS, also acknowledging the vote, said the Bill was a very important measure—one which reconstructed the Company, and made it the first Company in the country holding treble powers in gas, water, and electricity. They would endeavour to administer the treble powers as fairly as possible, without injuring one or the other. They intended to develop the new districts wisely for the benefit not only of the shareholders but of the districts themselves.

At the close of the ordinary meeting, a special meeting was held, at which the Directors were authorized to issue £25,000 of share capital, *plus* one-third loan capital, under the provisions of the Company's Provisional Order of 1903.

BOURNEMOUTH GAS AND WATER COMPANY.

Directorial and Secretarial Changes—A Larger Carry-Forward.

The Ordinary General Meeting of the Company was held on Friday, at the Company's Offices, No. 90, Cannon Street, E.C.—Mr. G. CRISPE WHITELEY in the chair.

The SECRETARY (Mr. H. A. Plumb) read the notice of meeting; and the Directors' report and the accounts were taken as read.

The CHAIRMAN said, in laying before the proprietors the accounts for the past half year, and in proposing the reception and adoption of the Directors' report, his first words must be to pay a tribute of respect to the memory of one who had left their ranks, and was no longer with them. Mr. Rymer—Alderman Rymer, as they were wont to call him, in recognition of the excellent public work which he did in his own district—was a member of the Board for more than eleven years. He was a regular attendant at the meetings, and did his work in a quiet and useful way. He (the Chairman) could not remember during the whole of the time that he was with them, a single hard or harsh word that he used towards anybody with whom he was brought into contact. It was a pleasure to work with him. He was kindly and courteous; and the Board had lost a gracious colleague, and the Company a good Director. In filling up the vacancy upon the Board, the Directors had taken an action, which he was sure would, in due course when the matter came before the proprietors, meet with their full approval. The Company was formed in 1864; and during the 45 years of its existence, it had only known two Secretaries—father and son; the late Mr. William Cash having been Secretary for 27 years; the present Mr. Cash having held the office for 18 years. During this period, they had received from their friend services far beyond the ordinary work of a Secretary. Mr. Cash's unrivalled experience in gas accounts, and his general knowledge in gas affairs, had always been placed at the disposal of the Board; and they had felt that the time had come when it would be right to invite Mr. Cash to leave the post he had so long adorned, and take the responsibility of a seat upon the Board. Mr. Cash took time to consider the matter. Sentiments had to be conquered. So far as the emoluments were concerned, the change was in the nature of an Irishman's rise; and there were, of course, legal difficulties to be considered. But, in the end, Mr. Cash had accepted the position; and he (the Chairman) very sincerely congratulated the Company upon this addition to the directorate. He need not say that all the necessary legal steps to isolate Mr. Cash the Director, from Mr. Cash the well-known member of the firm of Cash and Stone, had been taken; and he could only hope that they would long have the benefit of his services in his new position. Now they had the vacancy of Secretary to fill; and here the task had been extremely simple. As no doubt the proprietors were aware, Messrs. Cash and Stone had by arrangement provided the Board-room and London staff throughout the Company's career. This would continue. In Mr. Plumb, they had a gentleman who had been conversant with all the affairs of the Company for the last 32 years, who had been 20 years in the same firm as their late Secretary, and who, he was sure, would worthily maintain the traditions of the office. The proprietors would be asked to approve of the appointment, the terms of which were similar to those held by Mr. Cash. Coming to the accounts, although it had been his pleasure and pride to offer on many occasions most satisfactory statements with regard to the half-year's working, he doubted very much whether they had ever had a better one than on the present occasion. If he were tempted to use the popular phraseology of the day, he might call it a "record." Notwithstanding that they had recently reduced the price of gas by 3d.—a reduction synchronizing with the increase of the price of electricity—and although the price of residuals had decreased, and they had placed in the past year more than £1600 to the co-partnership scheme, the accounts had recovered themselves. They were paying increased dividends, and were carrying forward a larger reserve. Facts and figures were more eloquent than words; and he did not think that any words of his were needed to emphasize their satisfactory position. The co-partnership scheme had been launched most satisfactorily; and as the proprietors would see, they were paying the first bonus of £1608. They had 389 co-partners—practically all who were qualified to join the scheme; and they were receiving an average of £4 2s. 8d., in addition to which 24 of them had already shares in the Company. This, of course, was a small beginning; but it was a good one. He had already had the pleasure of addressing the combined staff, collected together on three occasions; and he wished the proprietors could have seen the eager enthusiasm with which they had entered into the new departure, their full recognition that their own prosperity was included in that of the Company, and their manifest loyalty to their chief, Mr. Harold Woodall. So far with regard to the past; now with regard to the future. The Directors had given the proprietors improved dividends; thay had reduced the price of gas to the consumers; and they had remembered the staff. In continuing the work, they must ever bear in mind what had often been said from the chair, that the interests of all were identical; and the stability of the institution depended upon the due recognition of this fact. The Company were now engaged in duplicating some of the trunk water-mains, and in enlarging others, to keep pace with the steadily increasing requirements of the consumers. He had kept his *bonne bouche* to the last. The proprietors had seen how, during the past year, the reduction in the price of gas had been followed by increased business; and although it was dangerous to prophesy, he had the authority of the Board for saying that, should the business increase as it had done lately, and should no untoward circumstance interfere with their plans, they might reasonably hope to see another decrease in the price of gas in the immediate future. The proprietors would thus see that the Board were carrying out the traditions of the past in considering the interests of all concerned; and he was justified in saying that the same policy which had brought the Company into such a satisfactory position would enable them to maintain their position, and, if possible, to achieve yet higher results in the future.

Mr. R. HESKETH JONES, in seconding the motion, fully endorsed the views of the Chairman as to the satisfactory prospects of the Company.

The motion was unanimously carried.

The CHAIRMAN proposed the declaration of dividends, less income-tax, for the half year, at the rate of 6 and 7 per cent. per annum on the preference and "B" ordinary shares respectively, and at 15 per cent. per annum on the original share capital.

Mr. WILLIAM CASH said he was very glad to have the opportunity of seconding this motion for the first time, when the Company were paying on the original shares a somewhat higher dividend than hitherto, though not the maximum dividend under the sliding-scale. He was sorry Mr. Corbet Woodall was not present; but they all knew what a hard-working man he was. He was taking a well-earned holiday in the North of England, and did not think, with such a report as this, anything contentious would arise at the meeting. Therefore he decided not to return to London specially on this occasion. The proprietors all knew the value of Mr. Woodall's services; and, in that sense, they regretted his absence. As the Chairman had made special reference to him (Mr. Cash), perhaps the proprietors would allow him to make two or three further remarks. He should like to thank the Chairman for his kind personal words. As he (Mr. Cash) had said on previous occasions, his work in connection with the Company had always been a pleasure; and he valued very highly the experience he had gained, through this Company, in connection with gas and water matters. He should also like on this first opportunity in his new position—a position he was proud to hold—to express his thanks to the present Board and to their predecessors for the extreme kindness and the appreciation he had always received in the conduct of the Company's affairs so far as they had been in his hands. The Company had achieved a considerable amount of success; and it was due, in very large measure, to the care and the skill with which its affairs had been managed by the gentlemen who had from time to time sat on the Board. He greatly appreciated the honour conferred upon him in asking him to take a seat on the Directors' side of the table. The Directors from the first had worked very hard in the interests of the undertaking, and had evinced deep concern in carrying on the business—a tradition that had been maintained by their revered Chairman that day, who actually had no business to be there at all. He had been extremely unwell; and it was only his sense of duty that had brought him to the meeting.

The motion was unanimously agreed to.

The CHAIRMAN proposed that the salary of the Secretary, as fixed by the Directors—viz., £900 per annum, including the provision of office accommodation and clerical assistance—be approved.

Mr. HESKETH JONES, in seconding, remarked that the remuneration was precisely the same as had hitherto been paid to Mr. Cash.

The proposition was heartily passed.

Mr. HESKETH JONES moved a vote of thanks to the Engineer and General Manager (Mr. Harold W. Woodall), to the Secretary, their respective staffs, and the workmen.

The CHAIRMAN, in seconding, remarked that the position of the Company was due to the cordial co-operation of the whole of the staff; and he heartily congratulated Mr. Woodall upon the state of the Company's affairs.

The motion was unanimously agreed to.

Moved by Mr. F. H. PILLEY, and seconded by Mr. J. C. BENWELL, the Chairman and Directors were thanked for their services.

The CHAIRMAN having responded,

Mr. HAROLD WOODALL thanked the Chairman and Mr. Jones for their kindly remarks as to the officers and the employees, who did most thoroughly appreciate the benefits they secured by serving under such a Board and Company. This was an exceptional occasion; and perhaps he might be permitted to say that the officials would have felt they had suffered a great loss if so admired a colleague as Mr. Cash had left them entirely. It was certainly welcome news when they heard that Mr. Cash was to be one of the Directors in future; and they were proud their association with him was to be continued.

Mr. PLUMB also replied, and at the same time thanked the proprietors for confirming the Directors' resolution as to his remuneration.

PROVINCIAL GAS COMPANIES.

A Good Increase at Bridport.

At the general meeting of the Bridport Gas Company, Limited, last Tuesday, the Directors reported that the sale of gas continued to show an increase; being nearly 2 million cubic feet, or about 8¼ per cent., greater than in the year ended June 30, 1908. The total quantity sold was 25,169,700 cubic feet, which produced £4773; and the total revenue was £6356, compared with £5906 for the preceding year. The expenditure was £5094; leaving £1262 to go to the profit and loss account, against £1116 at this time last year. The price of coal being higher, and the charge for gas not having been advanced, the Directors were unable to recommend an increased dividend. They, however, advised the payment of 7 and 5 per cent. on the ordinary and preference shares, less income-tax; leaving a balance of £509 to be carried forward. This was agreed to. The working, under the supervision of the Manager (Mr. W. H. Reed) resulted in the sale of 9169 cubic feet of gas per ton of coal carbonized; the coke, tar, and sulphate of ammonia sold being 1324 tons, 27,387 gallons, and 24 tons 11¼ cwt. respectively, or at the rates of 9·6 cwt., 9·9 gallons, and 20·5 lbs. per ton of coal.

Good Management at Bury St. Edmund's.

At the 120th half-yearly meeting of the Bury St. Edmund's Gas Company, the Directors recommended the payment of the usual dividend for the past half year of 10s. per share on the 1849 capital, 7s. 6d. per share on the 1859 capital, and 7s. per share on the 1879 capital, less income-tax. The Chairman (Mr. F. C. Andrews), in moving the adoption of the report, commented on the statement of accounts for the six months ended June 30, showing that the sale of gas brought in £3976, which was £100 in advance of the corresponding period of last year. The output of gas had, indeed, he said, reached as much as it was before the borough lamps ceased to be lighted by gas in 1902. This was considered very satisfactory. The manufacture of gas involved an outlay of £3198; but repairs of works were included in this amount. Further improvements in the way of extensions would, no

doubt, redound to the advantage of the Company, whose reserve fund now reached £3000, which was also very satisfactory. The Chairman referred to other matters which pointed to the progress of the Company and conduced to its general welfare. The Vice-Chairman (Mr. Floyd), in seconding the motion, expressed gratification that the reserve fund had received a substantial increase. The report having been unanimously adopted, the Chairman drew attention to the retirement of Mr. A. Mitchell, as Manager, after close upon thirty years' association with the Company. During his long connection with them, he had endeared himself to all the Directors by his ability, energy, and straightforwardness, having conscientiously discharged his arduous duties for this long period. For the appointment of his successor there were 130 applications; and they believed they had made a good choice in the selection of Mr. A. F. Young. Mr. Mitchell would retain the secretaryship. Mr. Mitchell acknowledged the kind remarks which had been made in appreciation of his services, and went on to speak hopefully of the Company's prospects; gas being, he said, in demand not only for lighting, but also for cooking, heating, motor power, and industrial purposes.

Increased Consumption and Extended Works at Camborne.

The report submitted at the annual meeting of the shareholders of the Camborne Gas Company last Wednesday set forth that during the past year upwards of 200 additional services had been connected and 33 cookers fixed. To meet the growing demand for gas the Directors entered into a contract with Messrs. Willey and Co., Limited, for the erection of an additional holder, which had just been completed (see *ante*, p. 462). New plant for the manufacture of sulphate of ammonia had been erected, and was giving every satisfaction. A mechanical washer had been purchased, and would shortly be erected at the works. In order to provide funds for these extensions, £4000 of additional capital was offered to the public and was considerably oversubscribed. The balance to the credit of the profit and loss account was £538, and the Directors recommended payment of a dividend of 3 per cent. for the half year; making a total of 5½ per cent for the year, which would absorb £360 and leave £178 to be carried forward. In consequence of the death of Mr. W. Bailey, the Manager and Secretary, the Directors secured the services of Mr. S. J. Ingram as Engineer and General Adviser, and appointed Mr. W. J. Crouch and Mr. C. C. Veale, both of whom were already in the service of the Company, as Secretary and Works Manager respectively. Mr. H. P. Vivian, the Chairman, in moving the adoption of the report, congratulated the shareholders on the continued prosperity of the Company, and said the output of gas had increased from 8½ million cubic feet to 23 millions. Under these circumstances, the additions which had been made to the plant were absolutely essential. Mr. Ingram, the Engineer, said the undertaking afforded proof that the gas industry was able to hold its own in spite of keen competition. The new consumers represented the artisan class, and there was room for great development among the small consumers, to whom they were now offering facilities. The erection of a new holder was needed, and would provide them in the coming year with storage equal to 24 hours' maximum consumption. The report was adopted, and the dividend recommended declared.

Depression Checks Increased Consumption at Leatherhead.

At the recent general meeting of the Leatherhead Gas Company, the Directors reported that the receipts in the year ended the 30th of June amounted to £9698, and the expenses to £7260; leaving a balance of £2438. The sum available for distribution was £2788; and the Directors recommended the payment of a further dividend of 2½ per cent., making with the interim dividend 5 per cent. for the year. This would absorb £934, and leave £1854 to be carried forward. The Chairman (Mr. F. Hue Williams), in moving the adoption of the report, said that, notwithstanding the unfair competition of the management of the Electric Lighting Company, they had held their own. They had been handicapped somewhat by dear coal; but, on the whole, he thought the shareholders could not but be satisfied with the balance-sheet they had received. There had been a loss on the sale of coke of £150. The market had been somewhat glutted with coke; a certain amount, they had reason to believe, having been dumped down in the neighbourhood. Out of the extra expenditure, the gasholder and tank just completed cost £3788; and other charges amounted to £962. These additions to the plant would relieve them of anxiety at times of heavy demand; and there were now greater facilities for the regular working of the retorts and other apparatus. They were also erecting, under the superintendence of their Consulting Engineer (Mr. F. S. Cripps), new offices and show-room. During the year the ordinary consumers had taken 445,000 cubic feet more gas, and there were 15 new customers. Through the prepayment system, 216,000 cubic feet more gas had been consumed, and the new consumers numbered 50. A greater increase would undoubtedly have been maintained but for some depression in trade, and a number of empty houses in the district. Mr. W. H. Brown, in seconding the motion, drew special attention to the excellent condition of the works; saying they were now better than they had been at any previous time in the Company's history. The motion having been carried, the retiring Directors and Auditor were re-elected, and the fees of the former were increased. The Chairman proposed a vote of thanks to the Secretary (Mr. J. Young), the Consulting Engineer, and the staff generally, for the efficient fulfilment of their duties; and it was unanimously accorded. The gentlemen named having acknowledged the vote, a similar compliment to the Chairman and Directors brought the proceedings to a close.

Good Profit and a Superannuation Scheme at Maidstone.

At the annual meeting of the Maidstone Gas Company on the 12th inst., the Directors reported a balance of £13,099 in favour of the Company; and they recommended the declaration of a dividend (less income-tax) for the year ended the 30th of June last at the rate of £7 5s. 6d. per cent. per annum, half of which had been paid as an interim dividend in March. The Chairman (Mr. George Marsham), in moving the adoption of the report, said the accounts accompanying it showed the stability of the undertaking, and that steady progress was still being made with the business. Although depression in trade last winter caused a decrease of about ½ per cent. in the gas sold on the year, yet their total profit on gas and residuals worked out at £13,753, compared with £13,342 the previous year; making the largest profit the Company had earned in any year. It was encouraging to find that the six months to the 30th of June compared favourably, as to the sale of gas, with the corresponding period in 1908. Improvements in the gas industry which were so greatly stimulated by the introduction of electric lighting continued to be made. The Company endeavoured to adopt all such improvements, and were now availing themselves of the Botley process to prevent naphthalene stoppages in gas mains and services. The cost of this was about £422; but the sum would probably be saved in the labour of clearing mains and pipes, while the complaints from consumers in regard to insufficient supply would in course of time greatly diminish. Having referred to the decision of the Corporation to further increase the public electric lighting throughout the town, and to the action taken by the Company in the matter, as noticed in the "JOURNAL" for June 29 (p. 988), the Chairman said the Directors, following the lead of the South Metropolitan Gas Company, and some other well-established companies, had inaugurated a superannuation scheme for their workmen, including foremen and slot-meter collectors. It came into operation on the 1st of July. A weekly contribution was made by all permanent employees, and the Company would contribute to the fund a sum which the Directors estimated at about £50 per annum. This would enable them to pay pensions of 5s. a week to workmen, and 10s. to foremen, on their attaining the age of 70 years; and the pension to workmen would not preclude them from enjoying the State old-age pension of 5s. a week. The sick and benefit fund had been working successfully for several years, and the Directors trusted the superannuation fund would work equally well, and prove very beneficial to the workmen, as well as being a further bond of union between employers and employed. In conclusion, the Chairman said the Board deeply regretted the loss by death of their colleague Mr. William Bryant, who had filled the offices of Auditor and Director for 33 years; and they had also lost another valued old friend in Sir George Livesey, by whose friendly and most valuable advice they had benefited on many occasions. The Deputy-Chairman (Dr. C. E. Hoar) seconded the motion; and it was carried unanimously. The dividend recommended was then ordered to be paid.

A Twelve per Cent. Dividend at Malton.

Notwithstanding the keen opposition of electricity for both lighting and motive power, the Malton Gas Company continue their progressive and successful career; and at the recent half-yearly meeting, the Chairman (Mr. Hugh W. Pearson) had the pleasure of moving the payment of a dividend of 6 per cent. for the six months ended June 30—this being the same amount as in the two immediately preceding half years. The Chairman submitted the report and accounts; the former opening with a reference to the satisfaction of the Directors at the maintenance of their business position. Owing to the depressed state of the market for residuals, it was stated that the income from this source had been less than in the corresponding half of last year. The sum applicable for dividend was £3456, out of which it was proposed to pay the usual dividend, free of income-tax, and carry forward £2016. It was mentioned that the Company had been successful in securing the contract for lighting the streets of Norton for the next three years; Malton being now lighted by electricity. They had also made a satisfactory contract for the supply of coals for the current year. In moving the adoption of the report, the Chairman said one feature to which he might allude had reference to their negotiations with the Assessment Committee of the Malton Board of Guardians. The Company had asked the Committee for a reduction in the amount of the assessment of their works and plant; and it appeared that the Committee had decided to engage an expert to go into the whole question. He thought the Company had good grounds for making a demand for a reduction. They had lost the lighting of Malton, in connection with which, of course, they previously had property liable to assessment; and they had kept up their dividends by rigid economy, and by the development of their business in the direction of the use of penny-in-the-slot meters and in other ways. The income from these was not rateable, and therefore the Company's request for a reduction of their assessment was a perfectly fair and legitimate one. Mr. Thurley Rose seconded the proposition; and it was unanimously carried. The dividend was then declared; and the usual votes of thanks to the Directors and officers brought the meeting to a close.

Increased Sales at Peterborough.

In moving the adoption of the report at the half-yearly meeting of the Peterborough Gas Company, Alderman D. H. Redhead, the new Chairman, deplored the loss of his predecessor, Mr. William Harris, to whom, he said, so large an amount of the prosperity of the Company was due. Turning to the working, the Chairman remarked that during the last twelve months they had sold between 6 and 7 million cubic feet more gas—a considerable increase, despite the competition of the electric light. They were putting down two benches of retorts to make gas of a better quality and with less waste. Their turnover was £33,000 a year; and they paid rates to the amount of £1680 annually. The only regret he had to express to the shareholders was the loss of their assessment appeal at Quarter Sessions. They felt very keenly having to pay £300 a year more in rates. He proposed the adoption of the report and accounts, and the payment of maximum dividends. Alderman Miller seconded the motion; and it was carried.

Economical Management and Reduced Price at Salisbury.

In moving the adoption of the report at the annual meeting of the Salisbury Gas Company last Wednesday, the Chairman (Mr. George Fullford) said the work of the Company during the past year had been satisfactory, and he could again congratulate the shareholders on the position of the business. Gas of a high degree of purity had been supplied; the illuminating power having averaged 17½ standard candles. The working plant had been maintained in sound condition and repair, some necessary additions had been made thereto, and new mains had been laid where required. The system of maintaining burners and mantles, both for inside and outside illumination, at a low fixed charge, was much appreciated by the consumers; and there was a steady demand for cookers, heating-stoves, and gas for power purposes. Coke had sold at lower prices than in 1908. The tar market continued

in the low state which had prevailed for some years past; but there was some improvement as regarded sulphate of ammonia. Chiefly owing to a reduction in the cost of coal on the contracts for the year just commenced, but also to some appreciable extent to the skill and economical management of their Engineer (Mr. Norton H. Humphrys), they were able to announce another reduction in the price of gas. On Oct. 1, 1908, it was reduced to 3s.; and this year they had decided to lower it to 2s. 11d. as from the 1st of October. The reduction could not apply to the public lighting, which stood on quite a different arrangement from consumption by meter. They took it at a fixed price per lamp, which covered much besides the gas consumed—such as lanterns, burners, supply-pipes, cleaning, painting, keeping in order, lighting, and extinguishing. A very large proportion of the price received went for labour and material; and while the cost for gas had been reduced, the other charges had increased. The extension of the borough, and the lighting of the courts in the city, had largely added to the mileage to be covered by the workmen as compared with the number of lamps; and any benefit arising from a lower cost for gas had been more than neutralized by the increased cost of labour and material. Mr. W. Young seconded the motion; and it was carried unanimously. The usual dividends having been declared, and the retiring Directors and Auditor re-elected, a vote of thanks was accorded to the Chairman, Directors, and staff for their services during the year. The compliment was acknowledged by Mr. S. R. Atkins on behalf of the Board, and by Mr. Humphrys on the part of the staff.

Another Year of Progress at Taunton.

At the annual general meeting of the Taunton Gas Company held last Tuesday, under the presidency of Mr. Jonathan Barrett, the Directors reported that the quantity of gas sent out in the twelve months ending the 30th of June was 105,792,000 cubic feet; and that the amount of profit available for distribution was £7580. Out of this, they recommended the declaration of dividends at the rates of 5 and 8 per cent. on the preference and consolidated "A" stock, and of 7 per cent. on the new ordinary stock and the yellow shares. These dividends would absorb £3720. The Directors further recommended that the additional dividends of 1 per cent. and ⅞ per cent. respectively payable under the sliding-scale, amounting to £454, should be transferred to the reserve fund account. The Chairman, in moving the adoption of the report, expressed his pleasure at announcing that the undertaking was continuing in the prosperous career it had had for so many years past; and he hoped and believed it would still go on doing so. The quantity of gas sent out during the past year showed an increase of 2,376,000 cubic feet on the previous twelve months. They had been continually increasing their output for years past; and with the completion of the extension of the works by the erection of the new holder and purifier, they would be able to meet all the demands which might be made upon them during the next ten or twelve years. The Deputy-Chairman (Mr. W. H. Fisher) seconded the motion; and it was carried. The dividends having been declared, and the amount proposed transferred to the reserve fund, a vote of thanks was accorded to the Chairman and Directors. Mr. Fisher, in proposing a similar vote to the Secretary and Manager (Mr. A. J. Edwards) and the staff, said that in Mr. Edwards they had a most energetic man, who looked well after the interests of the Company, and who also had a great knowledge of all matters connected with gas making. The staff also efficiently carried out their duties, which had considerably grown of late years, owing to the increase in the number of penny-in-the-slot meters in use. Mr. R. Bruford seconded the motion. The Chairman, in supporting it, said a better Manager than Mr. Edwards he did not think it was possible to have. The vote having been heartily accorded, Mr. Edwards, returning thanks, said he was able to state that the customers of the Company were better satisfied now than ever he had known them to be. At the present time the Company had 2200 prepayment customers in Taunton; and in a very few years, if they continued to increase at the present rate, these customers would equal, if they did not exceed, the others. They had brought their business to such a state of excellence that he did not think there were more than five or six other gas companies in the kingdom, whose results were published, who were doing as well as, or better than, their own Company in this respect. He was very proud of this fact; and he thought the shareholders would be pleased to know that their business was now on a very much broader basis than it used to be. He hoped it would continue.

Small Increase in Sale at Tunbridge Wells.

At the recent half-yearly meeting of the Tunbridge Wells Gas Company, the Chairman (Mr. W. H. Delves), in making the usual interim statement, said there had been a small increase in the sale of gas in the past six months, compared with the very large increase the preceding year. This was their usual experience after an exceptional increase; and looking at the reports of other large companies, it would be seen that they had all been adversely affected by the mild winter up to March. Their increase was 1½ per cent., against 7½ per cent. last year. They had a new contract for coal at a decrease of 1s. 4d. per ton; but the benefit of the new contract would not be felt until the current half year. The same remark applied to the new contract for oil, which was rather more than a ½d. per gallon less. The sale of residuals, as was the general experience of all companies last winter, was not satisfactory, especially in coke. Though they had sold more, the net result was £700 less. The general result was that, deducting the residuals, the cost of carbonizing was nearly 1d. more per 1000 cubic feet of gas sold. He hoped that, with the new contracts, this increase in cost would remedy itself. There was also a decrease in the revenue from public lighting, as the Corporation, in their wisdom, were altering 200 street gas-lamps to electricity at a higher charge than the Gas Company were prepared to tender. As the public lighting only represented 2¾ per cent. of the Company's revenue, this was of very small concern to the shareholders; and the cost of public lighting was now of far greater importance to the ratepayers, who paid the bill, than to the Company, who could afford, except in their capacity as large ratepayers, to look with indifference at the action of the Corporation towards them. The gas-rentals showed an increase in every department, except in street lighting and supplies outside the borough. The latter was difficult to account for. In regard to the co-partnership scheme, it had not been in operation long enough for the Directors to offer any judgment upon its working; but they had every confidence that it would prove a success, and that it was a step in the right direction to make their employees sharers in the benefits of the economical working and the growth of the Company's business. He believed the shareholders would be able to look forward with every confidence to the completed balance-sheet for the year. The usual interim dividends were declared; and a vote of thanks was passed to the Chairman.

Increased Carry-Forward at Wakefield.

The 125th half-yearly meeting of the Wakefield Gas Company was held on Monday last week. In moving the adoption of the report, the Chairman (Dr. W. A. Statter, J.P.) alluded to the loss the Directors had sustained in the deaths of the Secretary (Mr. W. H. Parker) and the Assistant-Manager (Mr. Frank Saville). Mr. Parker had been with the Company 32 years, for 18 of which he had held the position of Secretary; he had filled the position with credit to himself and to the complete satisfaction of the Board. Mr. Saville was also a valued officer, and his early death was deplored by the Directors. The Chairman then announced that they had elected as Secretary Mr. R. B. Wilson, who had been in the Company's service for 15 years, and in whom Mr. Parker and the Board had the utmost confidence, and who had during Mr. Parker's long illness carried on the work to their entire satisfaction. The shareholders unanimously approved the appointment. Dr. Statter then went through the various items in the balance-sheet, which he said was very satisfactory. They had earned their usual dividends, and carried forward £119 more than the amount with which they started the half year, in spite of bad trade and dear coal. A hearty vote of thanks was passed to the Chairman and Directors, in acknowledging which the Chairman moved a cordial vote of thanks to the officers and staff. This was unanimously carried, and responded to by the Engineer and Manager (Mr. H. Townsend) and the Secretary.

COAL MINES BILL.

The text has been issued of the Home Secretary's Bill to amend the Coal Mines Regulation Act of last year. It contains only two clauses, which are in the following terms.

1. Sub-section (1) of section 1 of the Coal Mines Regulation Act, 1908 (which prohibits a workman being below ground in a mine for the purpose of his work, and of going to or from his work, for more than eight hours during any consecutive twenty-four hours), shall be construed as if for the words "during any consecutive twenty-four hours" there were substituted the words "during any period of twenty-four hours, reckoned from midnight to midnight:"

Provided that:

(*a*) In the case of a workman whose period of being below ground commences at or before midnight and terminates after midnight, the period of twenty-four hours shall be reckoned from midday to midday; and

(*b*) An interval of at least eight hours shall elapse between the termination of one period of being below ground and the commencement of the next.

Sub-section (6) of section 1 of the Coal Mines Regulation Act, 1908, is hereby repealed.

2. This Act may be cited as the Coal Mines Regulation Act, 1909, and shall be construed as one with the Coal Mines Regulation Acts, 1887 to 1908, and this Act and those Acts may be cited together as the Coal Mines Regulation Acts, 1887 to 1909.

Reductions in the Price of Gas.

The Directors of the South Hams Gas Company have decided to reduce the price of gas from 3s. 11d. to 3s. 8d. per 1000 cubic feet from the 1st of October. The Cambridge Gas Company have reduced their price from 2s. 9d. to 2s. 8d. per 1000 cubic feet. At Grantham the price has been reduced from 3s. 2d. to 2s. 11d. The Gas Committee of the Warrington Corporation have resolved to reduce the price of gas 1d. per 1000 cubic feet throughout the area of supply as from the 1st of November next. The slot-meter consumers within the borough will have an additional 5 cubic feet of gas for 1d., and those outside a proportionate quantity. The Directors of the Alfreton Gas Company have decided to reduce the price of gas by 2d. per 1000 cubic feet, making it 3s. 10d., from the 1st of January next. The Montrose Gas Company have reduced the price of gas 2d. per 1000 cubic feet for all purposes, as from the date of the last meter inspection. The Rossendale Union Gas Company have reduced to 3s. 2d. per 1000 cubic feet the price charged to consumers of less than 500,000 cubic feet per quarter. With the view of encouraging cottagers to consume gas in the Sedgley, Lower Gornal, and Upper Gornal Districts, the Sedgley Urban District Council have decided to provide prepayment meters, cooking-stoves, and two lights in a house without any charge for rent of fittings, and also to reduce the price of gas from 3s. 6d. to 3s. 3d. per 1000 cubic feet. The Clitheroe Town Council have decided to reduce the price of gas from 3s. 2d. to 2s. 10d. after the 25th of March next. The Directors of the Salisbury Gas Company have reduced their price from 3s. to 2s. 11d. per 1000 cubic feet as from the 1st of October. As from the 30th prox., the price of gas at Wicklow will be reduced from 5s. 3d. to 4s. 11d. for lighting, from 4s. 9d. to 4s. 7d. for cooking, and from 4s. 4d. to 4s. 3d. for power purposes.

Accident at the Schoneberg Gas-Works, Berlin.—During a windstorm shortly after midday last Thursday, an iron tower 250 feet high, supporting a crane used in the construction of the gasholder now being built at the Schöneberg works of the Imperial Continental Gas Association, fell just as a train was passing over the adjacent railway line. Fortunately the train was almost empty; but one carriage was smashed by the wreckage, and five people were injured.

A CALORIFIC TEST FOR COAL GAS.

The following letter by Mr. G. M. Gill, of Blackheath, dealing with the subject of the calorific test for coal gas, appeared in the Engineering Supplement to "The Times" last Wednesday.

The calorific power test accepted by the Gaslight and Coke Company in their Bill, which formed the subject of an article by Professor Frank Clowes in "The Times" Engineering Supplement for July 28, has been, as might be expected, the subject of general discussion in gas engineering circles for some months past. While there is no objection to a heating standard taking the place of the now obsolete illuminating power standard, there is a grave objection to the introduction of an additional standard.

It is strongly felt now that the days of monopolies in lighting are past and over, and in times when there is severe competition on the part of electrical undertakings, that freedom from all restrictions and standards is most required to enable gas companies to give the consumer the service he requires, and which he is at liberty to reject in favour of electricity. There would not be so great an objection to standards and penalties on the part of gas supply companies were electrical undertakings placed in a similar position; but in the case of the latter there is freedom to supply their commodity as may best suit themselves and their consumers. It is, it must be admitted, unjust that of two traders, each appealing for the custom of the public, one should be hemmed in with restrictions while the other is given a free hand. It is reasonable to suppose that the suppliers of gas and electricity are best qualified to judge the most suitable form in which to supply their commodity; and, further, it must be remembered that on their judgment depends the support of the public. This is in itself quite sufficient to ensure a proper service.

However, as long as there are tests with which compliance must be made, gas companies will endeavour to advise Parliament by introducing into their Bills whatever alterations they deem necessary in the interests of the public. At the present time there is a strong feeling among gas engineers that the illuminating power standard should be abolished in favour of a calorific power standard. Were this carried out, it is quite certain that gas companies would give the remaining consumers still using the extravagant and quite obsolete flat-flame burner, facilities to replace them with a suitable burner of the incandescent type. It is said that in many Continental towns it is impossible to find a flat-flame burner; for the reason that in these towns gas is so much more expensive than it is in English towns, owing to the cost of raw material, that it is necessary, for economic reasons, to burn the gas in the most advantageous way.

In Berlin, which is often quoted as being the most brilliantly lighted city in the world, it is the custom to supply a gas of about 11-candle power, compared with from 14 to 17 candles in London. It is a change of this kind which English gas engineers recognize as being desirable at the present time. It should perhaps be pointed out that the lower candle power gas supplied in Berlin with an incandescent burner gives as much light as the higher candle gas supplied in English towns; and as the higher candle gas costs considerably more to manufacture, it will be seen that a great deal of money is in this country unnecessarily wasted.

There is one other point which should be raised, and it is that under the sliding-scale clauses it is obligatory for gas companies to reduce the price of gas to consumers before increasing the dividend to shareholders; and it depends on the amount of the reduction as to how much may be added to the dividend. In every reduction of the price of gas under the sliding-scale, it is so arranged that fully 80 per cent. or 90 per cent. of the saving goes to the consumer; the balance being credited to the shareholder. In this way, the interests of the public are most excellently safeguarded.

As Professor Clowes points out, the introduction of the calorific power test marks an era, and it is undoubtedly true that the example of the Gaslight and Coke Company will be followed in the acceptance by gas authorities generally of a calorific test, though not in addition to an illuminating power test.

The introduction of a test for standardizing the value of gas as a generator of heat will be a most excellent means of educating the public to appreciate properly the advantages and economies of superseding coal, with its attendant production of smoke and dirt, by gas for cooking and heating.

Professor Clowes's remarks as to the necessity of valuing coal more scientifically are indeed to the point, and should be more generally recognized and carried out by the consumers of our national coal supplies.

SULPHATE OF AMMONIA INDUSTRY IN GERMANY.

French manufacturers of sulphate of ammonia only supply a portion of the national consumption; the remainder being imported from England and Germany. It is consequently of interest to follow the progress of the industry in these places. The following are some details extracted by the "Revue des Produits Chimiques" from the annual report of the German Sulphate of Ammonia Association of Bochum.

A very brisk demand, especially in the English market, manifested itself at the commencement of 1908; but business was unfavourably influenced by the fall in Japanese orders and the difficulty experienced by the Japanese in meeting their engagements. A stoppage in the retrograde movement of prices in the English market occurred at the end of December, when the complete removal of stocks, owing to large shipments, demonstrated that the pessimistic views entertained during the year were ill-founded. This improvement is to be ascribed to the action of the Association, who withdrew entirely from the export market in the middle of the year, and thus allowed Great Britain to sell small quantities on the German coast with profit. Acting in this way, the Association considered that compensation for a fall in exports could only be obtained gradually, but that keen competition with Great Britain at a time when there could not be an increase in consumption would only result in destroying all firmness in the situation of the market, without any profit. This view was correct, because during the first months of the year business looked promising; shipments being 128,401 metric tons in the seven months ending in July, against 92,505 tons in the corresponding period of 1907. During the remaining five months, however, there were only 44,049 tons, against 63,138 tons in the preceding year. The quantity supplied by the Association in 1908 was 172,450 metric tons, to which must be added 5000 tons supplied by the Comptoir du Sulfate d'Ammoniaque of Brussels. Thus the total on account of the Association was 177,450 tons in 1908, against 155,643 tons in 1907. In addition, 9076 tons of concentrated ammoniacal liquor were shipped last year, against 13 286 tons in 1907; so that there is an increase of about 20,000 tons compared with 1907.

It is stated in the report that sulphate of ammonia is always cheaper now than Chili nitrates; and this is why German agriculturists find it to their advantage to give it preference. It has been clearly demonstrated that sulphate of ammonia is as rich in nitrogen as the nitrates. It is to be noted that in 1908 Germany took the lead with a consumption of 284,000 tons of sulphate of ammonia. Great Britain figures for only 79,000 tons; France for 87,000 tons; and Belgium and Holland for 67,000 tons. During the last decade, the German consumption of sulphate increased from 123,000 to 284,000 tons; while that of nitrates only rose from 325,000 to 400,000 tons in the same period. As the sulphate contains one-third more nitrogen than nitrate, it may be said that Germany consumes about as much nitrogen in sulphate as in nitrate. German imports of sulphate last year were 47,265 tons, against 38,522 tons in 1907; Great Britain supplying 24,913 tons and Austria-Hungary 17,928 tons in this total.

SALE VALUE OF CORPORATION UNDERTAKINGS.

Borough Treasurer of Nelson and Municipal Trading.

In presenting his annual report and abstract of accounts, the Borough Treasurer of Nelson (Mr. C. H. Brear) has something to say about municipal trading. He shows that the total assets of the Corporation exceed the liabilities by £255,987; and he points out that if the profits of the municipal trading concerns were capitalized at 3½ per cent., they would be sufficient to pay off not only the total loan debt but the whole of the outstanding liabilities of the Corporation. It must not, he adds, be supposed that these capitalized profits are intended to represent the true sale value of the various undertakings, but rather to indicate the extent to which the Corporation have been justified, from a financial standpoint, in carrying on the works. Mr. Brear proceeds: "Much outcry has been raised from time to time against the growing debt of municipalities as the result of municipal trading. This statement is designed to show, on the one hand, what the debt on the undertakings is, and, on the other, the working value to the town of the works and properties represented by the outlay. The most logical method of arriving at this value is suggested to me by the fact that upon the amount which it has been necessary to borrow the town has to pay interest at the rate of 3½ per cent. It is clear, therefore, that any capital investment which, after making proper provision for depreciation, has yielded a profit of 3½ per cent., has earned a sum sufficient to enable the concern to pay its way. If, however, greater profits than 3½ per cent. are made, a greater amount of capital must necessarily be taken, in order to bring the percentage of profit to the 3½ per cent. level, and the amounts shown as capitalized trade profits are therefore the amounts which, if sunk, would realize profits of exactly 3½ per cent. For instance, Nelson's gas undertaking, with a capital outlay of £200,199, yielded a trade profit of £15,175, or 7·58 per cent.; whereas 3½ per cent. on this capital would amount to only £7004, and consequently the amount of capital for which £15,175 would be 3½ per cent. is £433,571. The sale value of municipal undertakings cannot, of course, be gauged by the profits actually made. A corporation does not exist for the purpose of making profits out of its undertakings, but rather to use those undertakings to the general advantage of the ratepayers. Charges for the products or commodities are often cut down as low as the cost of production will allow, and the profits are necessarily much smaller than they would be by a company working solely for the benefit of shareholders."

ELECTRICITY DISASTER IN AN ITALIAN VILLAGE.

News reached London last Thursday of a terrible electricity accident which occurred in the village of Olginate, near Lecco, on the south-east arm of the Lake of Como, on the previous day, whereby twelve people were killed and about thirty sustained injuries. The following particulars of the catastrophe were given in the "Daily Telegraph" on Friday by the Milan Correspondent of that paper.

Olginate is situated on the left bank of the Adda River, a few miles south of Lecco. Electric light is cheap in the district, which is very rich in hydraulic power, and in every house even the stables are lighted by electric lamps. Last night [Wednesday], while a furious thunderstorm was raging over the Lake of Como and the bordering country, some wires conveying high-tension current from the power-house near Olginate were broken and fell, coming into contact with the electric light wires. A short-circuit was instantly produced in every house, and sparks and blue flames appeared. Instinctively somebody in every house switched off the light for the purpose of preventing the danger of fire. The result of this inconsiderate move was disastrous, for twelve people were killed outright, and twenty-nine received severe shocks and burns. The wires caught fire and fell from the walls, catching in their coils the terrified men and women. In some houses the walls and floors became charged with electricity to such a degree that the inhabitants could not touch them without getting shocks, and in many

cases they were forced to rush or jump out. In the meantime, everywhere in the village the lights were extinguished. The darkness increased the terror of the people, who began to flee through the gloomy streets under a pouring rain, madly screaming whenever flashes of lightning illumined the sky. At last the current was cut off, firemen and soldiers arrived from Lecco, and quiet was restored to the village. The victims belong almost exclusively to the lower classes of the population; and it seems that in their houses the electric fittings were on old systems, and not in good order. As a matter of fact, in the villas where the fittings were up to date, the short-circuit had no serious results, or only very slight ones.

USE OF TAR FOR DUST PREVENTION ON ROADS.

Opinions of Engineers and Surveyors.

Some time ago, a Committee was appointed by the Councils of the Metropolitan Boroughs, at the suggestion of a conference of delegates from local authorities held in Westminster early in 1903, for the purpose of considering the general question of materials and means of paving the streets of London. The Committee recently addressed a circular to the Engineers and Surveyors of the Metropolitan and neighbouring authorities, asking them to give the Committee the benefit of their experience as to the desirability or otherwise of tar-spraying macadamized or gravel roads, and the advantages and disadvantages generally of the system. The following are the replies received from those who have treated the roads in their district with dust-preventing materials.

Battersea.—The Borough Surveyor (Mr. T. W. A. Hayward) states that in his opinion it is desirable to treat roads with tar for the purpose of laying dust, &c. He considers it desirable to apply the tar by means of hand-painting, as by this method it is more evenly distributed over the roadways, and better results accrue. The cost of tar-painting in his borough has averaged ⅜d. per yard. This does not include sanding after painting, but includes the cleansing of the roadway before this operation. Tar-painting is, in his opinion, most advantageous for laying dust; and ordinary macadamized roads are more easily kept clean after they have been treated with tar.

Croydon.—The Borough Road Surveyor (Mr. E. F. Morgan) states that his experience is that by properly treating gravel, flint, or granite macadam roads with tar, many advantages are obtained. The road surface is very much preserved, disintegration being prevented, and the dust nuisance is thereby greatly reduced. The noise caused by vehicular traffic is minimized; and after rain the road quickly assumes a dry surface. From personal observation, he is of opinion that while horse-drawn vehicles and cycles require less effort when travelling upon a tarred surface, heavily-laden motor waggons and steam traction-engines require more traction effort than upon ordinary macadam, more especially when the tarred road surface is wet. Various so-called dust preventives have been tried in the borough; but the only satisfactory method has been the treatment with tar. After experience with a tar-spray machine, Mr. Morgan finds the best and most lasting results are obtained by hand labour—*i.e.*, a horse-drawn vehicle to convey the tar, and men with squeegees, with which the boiling tar is rubbed thoroughly into the surface. This is afterwards coated with coarse granite chippings, and in busy thoroughfares this is quickly faced-up by the passing traffic. In residential streets, a light petrol-driven roller is used for the purpose. The cost of the treatment described works out at about 1·3rd. per superficial yard.

East Ham.—The Borough Engineer (Mr. A. H. Campbell) has treated flint roads, gravel roads, and granite macadam roads with tar; and he finds that those which have given the best results are gravel roads, bound together by tar as a consolidating agent or medium, when the road itself was in course of construction. He has also sprayed tar upon flinted roads already consolidated by time and traffic; but as yet he is unable to form an opinion as to its desirability and efficiency. The best dust-preventing material he has yet used upon macadamized or gravel roads is refined tar, at 3d. per gallon, delivered upon the work; each gallon covering 7 to 8 yards. He has applied the tar by hand, well brushed on to the surface of the road, also by a force-pump direct from the tar-boiler, and likewise by the hand-spray, which, in his opinion, though not so fast, is very facile and economical. Tar itself will work out at about ⅜d. per superficial yard, labour at about ⅜d., and sanding at less than ¼d.—say, in all, 1½d. per yard. He does not consider a tar-sprayed road suitable to sustain the weight and the momentum, with its consequent suctional action upon the road surface, of vehicles mechanically propelled; but he considers it quite suitable for those which are horse-drawn vehicles.

Fulham.—The Borough Engineer and Surveyor (Mr. Francis Wood) considers it desirable that all macadam roads should be tar-sprayed. He has obtained the sanction of his Council to treat the whole of the macadam roads in his borough, and about one-third have already been done. The roads are sprayed by hand, and the cost works out to practically ¼d. per superficial yard. He considers that only roads which have not been recently made-up should be sprayed with tar; and he finds it is practically useless to treat flint and gravel roads where there is much traffic. The saving in scavenging is very considerable.

Greenwich.—The Borough Engineer and Surveyor (Mr. E. J. Heward) has not tried tar-spraying, but has treated some roads on Blackheath with tar, put on boiling hot by hand, brushed into the road, and then covered with sand. This work has been too recently done to enable him to say whether or not the method is altogether satisfactory.

Kingston-upon-Thames.—The Borough Surveyor (Mr. R. Hampton Clucas) states that the main streets of Kingston—the shopping district—are treated with Akonia, which he says is very easily applied, and gives good results. If this area were tarred, he thinks the shopkeepers would find tar carried into their shops, and complaints would soon be lodged. The main Portsmouth road is treated with Hahnite; and Mr. Clucas finds that a coating put on once every five weeks is sufficient to keep down the dust. The cost is 0·9d. per square yard. Many roads

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 503.

Issue	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Apl. 16	10	Alliance & Dublin 10 p.c.	17⅜–18¼	..	5 9 7
298,955	10	,,	7	Do. 7 p.c.	12⅛–13	..	5 7 8
310,000	Stk.	July 14	4	Do. 4 p.c. Deb.	96–98	..	4 0 0
200,000	5	May 27	6½	Bombay, Ltd., . . .	5⅜–5⅝	..	5 10 8
40,000	5	,,	6½	Do. New, £4 paid .	4⅜–4⅝	..	5 12 5
50,000	10	Feb. 25	15†	Bourne- } 10 p.c. . .	28⅜–29½	..	5 2 6
311,810	10	,,	7	mouth Gas } B 7 p.c. .	16⅜–17¼	..	4 1 2
75,000	10	,,	6	and Water } Pref. 6 p.c.	15⅜–15⅝	..	3 15 7
380,000	Stk.	Aug. 12	12½	Brentford Consolidated	250–253*	..	4 18 10
300,000	,,	,,	5½	Do. New . . .	190–192*	..	4 19 0
50,000	,,	,,	5	Do. 5 p.c. Pref. .	120–122*	..	4 2 0
206,250	,,	June 11	4	Do. 4 p.c. Deb. .	100–102	..	3 18 5
220,000	Stk	Mar. 12	11†	Brighton & Hove Orig.	213–215	..	5 2 4
246,320	,,	,,	8†	Do. A Ord. Stk. .	154–156	..	5 2 7
460,000	20	Apl. 16	10	British	43–43½	..	4 11 11
109,000	Stk.	Feb. 25	6	Bromley, A 5 p.c. . .	119–121	..	4 19 2
165,700	,,	,,	4½	Do. B 3½ p.c. . .	89–91	..	4 18 11
82,278	,,	,,	5½	Do. C 5 p.c. . .	108–110	..	5 0 0
55,000	,,	June 25	3½	Do. 3½ p.c. Deb. .	88–90	..	3 17 9
500,000	10	May 13	7	Buenos Ayres (New) Ltd.	13½–14	..	5 0 0
250,000	Stk.	June 25	4	Do. 4 p.c. Deb. .	94–96	..	4 3 4
100,000	10	—	—	Cape Town & Dis., Ltd,	4½–5	..	—
100,000	10	—	—	Do. 4½ p.c. Pref. .	5½–6	..	—
50,000	50	May 3	6	Do. 6 p.c. 1st Mort.	48½–49½	..	6 1 3
100,000	Stk.	June 25	4½	Do. 4½ p.c. Deb. Stk.	82–84	..	5 7 2
157,150	Stk.	Aug. 12	5	Chester 5 p.c. Ord. . .	106½–108½*	..	4 12 2
1,493,280	Stk.	Mar. 12	5⅜	Commercial 4 p.c. Stk. .	109–111	..	4 13 8
560,000	,,	,,	5	Do. 3½ p.c. do. .	105–107	..	4 13 5
475,000	,,	June 11	3	Do. 3 p.c. Deb. Stk.	81–83	..	3 12 3
800,000	Stk.	,,	5	Continental Union, Ltd.	95–97	–1	5 3 1
200,000	,,	,,	7	Do. 7 p.c. Pref.	138–140	..	5 0 0
492,470	Stk.	—	5	Derby Con. Stk. . . .	121–123	..	4 1 4
55,000	,,	—	4	Do. Deb. Stk. . . .	103–105	..	3 16 2
148,995	,,	Mar. 31	5	East Hull 5 p.c. Ord. .	100–102	..	4 18 0
486,693	10	July 14	12	European, Ltd. . . .	24½–25	+½	4 16 0
354,060	10	,,	12	Do. £7 10s. paid.	18¾–19	+¼	4 14 9
15,141,545	Stk.	Aug. 12	4⅜	Gas } 4 p.c. Ord. . .	104–105*	..	4 8 10
2,600,000	,,	,,	3⅛	light } 3½ p.c. max. .	87–89*	..	3 18 8
3,799,735	,,	,,	4	and } 4 p.c. Con. Pref.	103–105*	..	3 16 2
4,193,975	,,	June 11	3	Coke } 3 p.c. Con. Deb.	85½–86½	..	3 9 4
258,740	Stk.	Mar. 12	4⅜	Hastings & St. L. 3½ p.c.	93–95	..	5 0 0
82,500	,,	,,	6¼	Do. do. 5 p.c	118–120	..	5 4 2
70,000	10	Apl. 29	11	Hongkong & China, Ltd.	17⅞–18¼	..	6 0 7
123,5?0	Stk.	Mar. 12	6½	Ilford A and C . . .	141–143	..	4 10 11
65,783	,,	,,	5	Do. B	106–108	..	4 12 7
63,000	,,	June 25	4	Do. 4 p.c. Deb. . .	102–104	..	3 16 11
4,949,000	Stk.	May 13	8	Imperial Continental .	179–181	..	4 8 5
473,600	Stk.	Aug. 12	3½	Do. 3½ p.c. Deb. Red.	95–97*	+1	3 12 11

Issue.	Share.	When ex. Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
195,242	Stk.	Mar. 12	6	Lea Bridge Ord. 5 p.c. .	120–122	..	4 18 4
561,000	Stk.	Feb. 25	10	Liverpool United A. .	228–230	..	4 6 10
718,100	,,	,,	7	Do. B . .	168–170	..	4 2 4
306,083	,,	June 25	4	Do. Deb. Stk.	104–106	..	3 15 6
75,000	5	June 11	6	Malta & Mediterranean.	4⅜–5⅛	..	5 17 1
560,000	100	Apl. 1	5	Met of } 5 p c. Deb.	101–103	..	4 17 1
250,000	100	,,	4½	Melbourne } 4½ p.c. Deb.	102–104	..	4 6 7
541,920	20	May 27	3½	Monte Video. Ltd. .	12⅛–13	..	5 7 8
1,775,892	Stk.	July 29	4½	Newc'tle & G'tesh'd Con.	106⅛–107½	..	4 3 9
518,795	Stk.	June 25	3½	Do. 3½ p.c. Deb.	92–93	+½	3 12 2
15,000	10	Feb. 25	10	North Middlesex 10 p.c.	19⅛–20	..	5 0 0
55,940	10	,,	7	Do. 7 p c	13–13⅛	..	5 3 8
300,000	Stk.	Apl. 29	8	Oriental, Ltd. . . .	139–141	+2	5 13 6
60,000	5	Mar. 31	8	Ottoman, Ltd. . . .	6⅛–6⅜	..	6 5 6
31,830	53	Feb. 25	13	Portsea Island A. . .	140–142	..	4 16 11
60,000	50	,,	13	Do. B. . .	132–134	..	4 17 0
100,000	50	,,	12	Do. C. . .	123–125	..	4 16 0
114,800	50	,,	10	Do. D and E.	103–105	..	4 15 3
398,490	5	May 13	7	Primitiva Ord. . . .	6⅛–7⅛	–⅛	4 18 4
796,583	5	July 29	5	Do. 5 p.c Pref. .	5¼–5⅝	..	4 10 11
488,903	100	June 1	4	Do. 4 p.c. Deb. .	91–96	..	4 3 4
1,000,000	10	Apl 29	8	River Plate Ord. . .	16⅜–17¼	..	4 12 9
312,650	Stk	June 25	4	Do. 4 p.c. Deb. .	96–98	..	4 1 8
250,000	10	Mar. 31	8	San Paulo, Ltd. . . .	4–14½	..	5 10 4
62,500	10	,,	6	Do. 6 p.c. Pref. .	12–12½	..	4 16 0
125,000	50	July 1	5	Do. 5 p.c. Deb. .	49½–50½	..	4 19 0
135,000	Stk	Mar. 12	10	Sheffield A	236–238	..	4 4 0
2?9,984	,,	,,	10	Do. B	233–235	..	4 5 1
523,500	,,	,,	10	Do. C	232–234	–1	4 5 5
70,000	10	June 11	10	South African	13½–14	..	7 2 10
6,429,895	Stk.	Aug. 12	5⅓	South Met., 4 p.c. Ord.	119–121*	..	4 8 1
1,895,445	,,	July 14	3	Do. 3 p.c. Deb.	84⅓–85⅓	..	3 10 2
209,820	Stk.	Mar. 12	8	South Shields Con. Stk.	153–155	..	5 3 3
605,000	Stk.	Aug. 12	5½	S'th Suburb'n Ord. 5 p.c.	118–120*	..	4 11 8
60,000	,,	,,	5	Do. 5 p.c. Pref. .	120–122*	..	4 2 0
117,058	,,	July 14	5	Do. 5 p.c. Deb. Stk.	122–124	..	4 0 8
502,310	Stk.	May 13	5	Southampton Ord. . .	110–112	..	4 9 3
120,000	Stk.	Aug. 12	6¼	Tottenham } A 5 p.c. .	130–132*	..	5 4 2
453,940	,,	,,	5⅝	and } B 3½ p.c. .	109–111*	..	4 16 7
149,470	,,	June 25	4	Edmonton } 4 p.c. Deb.	100–102	..	3 18 5
182,380	10	June 11	8	Tuscan, Ltd.	9–9⅜	..	8 8 6
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.	99–101	..	4 19 0
236,476	Stk.	Aug. 14	5	Tynemouth, 5 p.c. max.	109–111*	+½	4 10 1
255,636	Stk.	Feb. 25	6⅝†	Wands- } B 3½ p.c. . .	140–142	..	4 13 4
79,416	,,	June 25	3	worth } 3 p.c. Deb. Stk.	73–75	..	4 0 0
895,872	,,	Aug. 12	5⅜	West Ham 5 p.c. Ord. .	124–126*	..	4 5 4
210,000	,,	,,	5	Do. 5 p.c. Pref. . .	127–129*	+1	3 17 6
253,300	,,	June 25	4	Do. 4 p.c. Deb. Stk..	112–114	+2	3 10 2

Prices marked * are "Ex div," † Next dividend will be at this rate.

have been tarred by hand at a cost of 1½d. per square yard, and a number tarred with a horse-drawn machine at a cost of ½d. per square yard; these prices including brushing the roads, spreading the tar, and sanding. The advantages of tarred roads are, in Mr. Clucas's opinion, less scavenging, little watering required, the dust considerably reduced, and the life of the street increased by 50 per cent. He uses oil of tar for all flint roads and outside roads, and the results are very satisfactory. No watering is required; there is no dust; and the cost is less than watering—it being only 0·21d. per square yard. He finds tar on flint roads not satisfactory, owing to the fact that in wet weather the metal picks up. He much prefers refined tar for dressing, as the results can be relied upon; but in crude tar they are doubtful.

Lewisham.—The Borough Engineer and Surveyor (Mr. E. van Putten) has treated granite macadam roads by tar-spraying. The cost of this, including tar and labour but not sanding, was ⅜d. per yard super. He estimates the cost of sanding at about ¼d. per yard.

Middlesex.—The County Engineer and Surveyor (Mr. H. T. Wakelam) says he is this year tar-painting the whole of the county main roads under his direct control; the work being carried out with horsed spraying-machines. Distilled tar, Clare's composition, and "Tarvia" are used, and the cost allowed for the work if carried out by hand labour is 1¾d. per yard; if by horse machine, 1d. per yard; and if by mechanical spreaders, ¾d. per yard.

St. Pancras.—The Borough Engineer and Surveyor (Mr. W. N. Blair) states that they have only made one experiment in tar-spraying a macadamized road, and it was not a success, probably on account of the weight of traffic using the road. It was noticeable that a large amount of black oily mud was produced for some time after the application of the tar; and Mr. Blair is by no means encouraged to repeat the process in a street subject to heavy traffic.

Wandsworth.—The Borough Engineer and Surveyor (Mr. P. Dodd) states that during the summer of 1908 a length of about 14½ miles of road was tar-sprayed with beneficial results at a cost of 1d. per superficial yard. The tar was applied under pressure by a machine. Watering has been unnecessary in most of the tar-sprayed roads; while in others, subject to motor and omnibus traffic, a little sprinkling on the sides, or occasional washing only, has been sufficient. A considerable saving has been effected in street watering; and the cost of cleansing and maintaining the roads has been materially reduced. Tar-spraying is not suited to roads with steep gradients; but on other granite macadam roads it is equally suitable for horse-drawn and for mechanically-propelled vehicles. The only disadvantage is the temporary inconvenience to the public while the roads are being sprayed. The total length of roads repairable by the borough is approximately 185 miles, of which 17 miles have already been tar-sprayed; and during the current year a further 40 miles will be treated in this manner. The work is carried out under contract, and the present cost is 1d. per superficial yard for one coat, less 2½ per cent.

Westminster.—The City Engineer and Surveyor (Mr. J. W. Bradley) is of opinion that tar spraying and painting is a satisfactory method of treating macadamized roads. He finds the cost to average about ¾d. per yard super.

Wimbledon.—The Borough Engineer and Surveyor (Mr. C. H. Cooper) states that last year they had a length of about a mile of macadamized carriageway done with Clare's composition, and about one-third of a mile with "Tarvia." This year they are having about six miles of carriageway treated partly with distilled tar and partly with gas tar. The method adopted has been to have the dressing spread by one of the "Taroad" distributors. Mr. Cooper considers the dressing is equally suitable for horse-drawn and mechanically-propelled vehicles. Last year the roads treated were subjected to motor-omnibus traffic. The costs this year per superficial yard are 1 9·40d. for distilled tar, and 1 7·20d. for "Tarvia." The advantages of treating roads with such dressings are that they prevent dust arising from the road material, and thereby effect considerable economy in maintenance. The great disadvantage of tar is that persons will walk on roads newly tarred, and carry the tar into houses and shops; and there are always a certain number of complaints that fresh tar spoils dresses and the paint on motor cars and other vehicles.

Woolwich.—The Borough Engineer and Surveyor (Mr. J. Rush Dixon) states that during the summer of 1908 trials of various dust-laying specialities were undertaken; and he also experimented with ordinary gas tar and petroleum oil. About half-a-mile of road was treated in each case; and the experiments were all fairly satisfactory, and provided an opportunity of judging the effectiveness. This year an agreement has been entered into with the Taroads Syndicate for tar-spraying with heated tar composition about six miles of roads, at a cost of ⅜d. per superficial yard, exclusive of previously sweeping the road and subsequently sanding over to blind the tar. The cost of sweeping and blinding works out at about ½d. per yard. Mr. Dixon says that the advantages of this treatment are that it serves not only as a dust palliative, and does away with constant watering, but also keeps the surface of the road well together, thereby lengthening the life of the macadam; and as it is applied by a mechanically-driven vehicle in widths of about 7 to 8 feet, roads are quickly coated and made ready to receive the ordinary traffic. He considers that it is suited equally for horse-drawn and mechanically-propelled vehicles; and so far he has not heard of any disadvantage attributable to the system.

As will be seen from the preceding answers, the engineers and surveyors who have experimented with tar-spraying are practically unanimous in favour of this method of treating gravel and macadam roads. The advantages claimed are that the road surface is preserved, disintegration is lessened, and the dust greatly mitigated. In addition, the expenditure on cleansing, watering, and maintaining tar-sprayed roads is considerably less than that incurred on roads not so treated. The noise caused by vehicular traffic is minimized; and after rain the road dries quickly. The application of the tar by hand as against machine spraying is mostly favoured. The cost varies from about ½d. to 1½d. per superficial yard, according to the method of treatment.

NOTICE.

THE BLAND LIGHT SYNDICATE, LTD., have had to seek the assistance of the Courts for Infringement in connection with their well-known Burners. The action has been disposed of on satisfactory undertakings being given and on payment of an agreed sum for damages and costs.

The **BLAND BURNER** is entirely of **BRITISH MANUFACTURE.**

All **BLAND BURNERS** are Manufactured on scientific lines under **ENGLISH PATENTS.**

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THE BLAND LIGHT SYNDICATE, Ltd., 63, QUEEN VICTORIA ST., LONDON, E.C., & 20, FENNEL ST., MANCHESTER.

THE NEW RESERVOIR AT CHINGFORD.

On the occasion of the recent annual meeting of the Association of Municipal Engineers in London, a visit was paid to the reservoir in course of construction for the Metropolitan Water Board at Chingford, the commencement of which, on April 11, 1908, was noticed in the "JOURNAL" at the time. In view of the visit, the following particulars in regard to the reservoir were prepared by Mr. W. B. Bryan, M.Inst.C.E., the Chief Engineer of the Board.

The Chingford reservoir will contain about 3000 million gallons. The water area is 416 acres, and the length of embankment about 4½ miles. The embankment will be formed of material excavated from within the reservoir, and will contain 2,060,000 cubic yards of earthwork and 253,000 cubic yards of puddle. The top of the embankment will be 15 feet wide and at a level 5 feet above top water. The outer slope is 2½ to 1, and the inner slope 3 to 1 for the lined portion, and 4 to 1 below. The amount of puddle below the ground surface will be 100,000 cubic yards; the depth of the trench varying between 15 feet and 30 feet. The puddle is 5 feet wide at the top (3 feet below the top bank level), and batters on both sides for a depth of 23 ft. 6 in.; being 9 feet wide at this level. It continues this thickness until 2½ feet below the ground surface, then batters in with slopes of 1 to 1 on both sides to a thickness of 6 feet, and remains at this thickness until the London clay is reached. It then slopes in again with ½ to 1 slopes for a depth of 3 feet, forming a key into the London clay. The top portion of the inner slope will be lined with concrete, which for a distance of 4 feet below top water will be faced with brickwork. At the top of this lining a brick-faced vertical wall, 3 feet high, will be built and finished with a concrete coping, rounded off at the bottom to meet the lower portion of the lining which is formed on the slope.

The water will be pumped into the reservoir from the River Lea and the Lea Navigation at the north end through five lines of 48-inch cast-iron pipes passing up the outer slope and discharging into a chamber at the top of the embankment. From this chamber the water will pass over a long granite sill down an inclined slope into a stepped channel, which will conduct it into the bottom of the reservoir (when commencing to fill), where it will be discharged on to a concrete apron. The reservoir is divided at about the middle of its length by a central embankment without a puddle core. There will be a culvert through this embankment to allow free circulation. The outlet from the reservoir will be at the south-east corner, where the water will pass through two shafts controlled by valves, and connected by a tunnel in the London clay.

The valve-houses on the outlet-shafts will be constructed of concrete, and have domed roofs; the surfaces being treated in the manner described later on for the bridge parapets. The inner shaft will be connected to the reservoir embankment by a reinforced concrete bridge, 6 feet wide between the parapets, and 20-feet span. The parapets of this bridge will be reinforced to act as girders supporting the decking. From the outer shaft the water will pass through a line of 36-inch pipes to a chamber controlled by an automatic valve. From this chamber an outlet channel conducts the water for a distance of about two miles to an existing basin, whence it can be passed to the other reservoirs of the Board's eastern district, and afterwards to the filter-beds at Lea Bridge. From the outer shaft of the reservoir there will be a line of 36-inch scour-pipes discharging into the Lea Diversion.

The construction of the reservoir necessitates several considerable subservient works. The River Lea will be diverted for a distance of three miles through a channel 55 feet wide, with side walls of concrete faced with Kentish rag and coped with concrete blocks. Intake channels are also to be constructed of a similar nature from the River Lea and the Lea Navigation to the pumping-station at the northern end of the reservoir. A channel 3½ miles long is to be constructed along the eastern side of the works, to divert the contaminated water from the hillside, and discharge it below Flander's Weir into the old river channel. This provision was deemed advisable, as the Board abstract water for their existing reservoirs at Chingford Mill 1¾ miles below the southern end of the new reservoir.

An overflow weir has been constructed to pass flood waters from the Lea Navigation discharging into the old River Lea below the reservoir. The public road crosses this channel on a concrete bridge having three 7-feet spans. The towing path crosses the overflow weir on a reinforced concrete bridge having fifteen spans of 10 feet; it also crosses the weir supplying water to the pumps from the Lea Navigation by a similar bridge of eight spans. The Lea Valley road is to be diverted for a length of 1000 yards, and will have a surface of tar macadam.

The intake channel from the River Lea and the Lea Diversion will be crossed by five reinforced concrete arch bridges. The one carrying the public road over the Lea Diversion will be on the skew, and have three spans of 27½ feet with 5 feet rise, and a width of 40 feet between the parapet walls. The other four bridges will have single spans, one of 50 feet with a width of 6 feet between the parapets, and three of 55 feet with a width of 12 feet between the parapets; the rise in all cases being 5½ feet. The parapets of these bridges, as well as that carrying the road over the overflow from the Lea Navigation, will be of concrete, reinforced against temperature cracks with steel rods, and will be formed with panels—the large surfaces relieved by having the mortar brushed out of the concrete, leaving the stones projecting.

The amount of the contract is £340,770; but the new pumping-station for filling the reservoir is not included. Messrs. C. Wall, Limited, are the Contractors for the works.

With a capital of £1000 in £1 shares, the Etna Lighting and Heating Company, Limited, was registered last week. The Safety Auto-Light Company, Limited, with a capital of £2500 in £1 shares, was registered on the 12th inst.

TRIBUTES of MERIT

No. 1. Showing that DAVIS'S PATENT STEAMLESS RADIATOR does its Work Rapidly and Well.

Illustration of 8-loop STEAMLESS RADIATOR.

THE two Steamless Radiators fixed by you in our office have acted admirably. During the last cold weather "snap" our thermometer on the day on which the Radiators were fixed only registered 48 degrees, but within two hours from being lighted we were in an agreeable atmosphere of 60 degrees. What they are capable of achieving we cannot say, as we do not care to work in a heat above 60 degrees, but when this has been reached—WHICH IS NOW DONE VERY QUICKLY—we turn one Radiator out, and the other partly so if necessary.

THE DAVIS GAS STOVE COMPANY, LTD.,
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DIAMOND FOUNDRY, LUTON.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The Gas Committee of the Glasgow Town Council reported the other day that there had been submitted to them a memorandum prepared by the Treasurer, Mr. James Fleming, as to the pecuniary allowances paid by the Corporation to employees under the age of seventy years, and that, after considering it, the Committee agreed to recommend that the allowances set forth be granted to seventeen employees for the period till May 31 next, or for such other restricted period as might be necessary in the event of any contrary recommendation being made by a Special Committee appointed on April 29 last to consider and report as to the question of pensions and allowances to ex-officials and other employees, and which might be approved of by the Corporation. The allowances range from 5s. to 20s. per week, and amount, in the aggregate, to £9 14s. per week. The Committee also reported that they had considered a memorandum prepared by the Treasurer, showing the effect of the provisions of the Old Age Pensions Act of 1908, in regard to the allowances paid to employees of the Corporation who have attained the age of seventy years and upwards; and that they had agreed to recommend that the allowances set forth be granted to 38 employees, which would effect an annual saving of £163 3s.—to take effect for the period from Sept. 1 to May 31, 1910, or for such other restricted period as might be necessary in the event of any contrary recommendation being made. The allowances recommended varied from 5s. per week up to £52 a year. They amount, in the aggregate, to £19 5s. per week. Taken along with the allowances to employees under seventy years of age, the weekly charge upon the Corporation in respect of allowances to employees is, roughly, £30, or about £1500 a year.

The annual report by Mr. W. Ritchie, the Gas Manager, to the Corporation of Peterhead, adopted at the last monthly meeting of the Town Council, is an interesting document. Mr. Ritchie stated that since he submitted his previous year's report they had encountered a few somewhat adverse circumstances, owing to certain market fluctuations and local charges over which they had no control, and they might be well pleased that even with these adverse causes they were able to show a favourable balance. Last year the price of gas was reduced 3d. per 1000 cubic feet, equal to £524. Had it not been that they were able to make favourable coal purchases in May last year, the result might have been different. For the year just ended they had carbonized 4805 tons of coal and produced 49,427,700 cubic feet of gas—equal to 10,296 cubic feet per ton—against 4587 tons of coal the previous year, producing 46,500,000 cubic feet of gas, or equal to 10,137 cubic feet per ton. The increased make of gas, therefore, was 2,972,700 cubic feet. The total expended on coal, including freight, harbour dues, cartages, and trimming, amounted to £3787, as against £3641 for the previous year—an increase of £146. The revenue from the sale of gas was £6551, as against £6848—a decrease of £297. But were they to add the reduction of £524, they would have an increase of £226. During the year they had added to their ordinary meter consumers 84, making a total of 1591; and they had added to the number of their prepayment consumers 136, making a total of 1241. The total number of consumers on May 15 last was 2832. The total expenditure on revenue account amounted to £6426; and the contribution to sinking fund, interest, and bad debts to £1890—a total expenditure of £8316. The total receipts amounted to £8401; and there was thus a balance on the year's working of £85. For the current year they had purchased coal at 1s. per ton less than last year; and he was confident that the year would turn out favourably. Under present conditions, it could hardly be expected that any alteration could take place in the price of gas this year.

An appreciative article regarding the work at Banchory of Mr. A. Watt, who has been appointed Manager of the Alyth Gas Company, was published in an Aberdeen newspaper this week. In it the writer stated that "the approaching departure of Mr. A. Watt for the more important appointment at Alyth is a noteworthy fact for more reasons than one." He proceeds: "Only twelve months had elapsed from the date of his coming to Banchory to that which terminated his stay here; but, in the words of one of our most highly-esteemed citizens, who has several times been a Director of the Gas Company—'more improvements have been carried out by Mr. Watt during his all-too-brief tenure of office than had taken place in all the previous forty years put together.'"

In introducing the annual accounts of the Corporation Electricity Department to Glasgow Town Council on Thursday, Bailie J. W. Stewart stated that the gross revenue amounted to £245,672, and the expenditure to £104,902; the net result, after providing for interest, sinking fund, and depreciation, being a deficiency of £3544, which had been met from the reserve fund. While the revenue was rather less than in the previous year, this arose from causes which could be easily explained. In each of the two previous years there had been an increase of £30,000 in revenue; but these were record figures. The shrinkage in revenue was due to a small extent to the depression which had affected every industry in the country. It was also due to the reduction of rates conceded to certain classes of consumers, which represented a considerable saving to them. Another cause was the introduction and very extensive use of the metallic filament lamps, which they had urged their customers in their own interests to adopt. A further cause was the closing of the annual accounts eight days earlier than usual, which had resulted in a sum of £3400 of revenue not being brought into the accounts. The shrinkage in revenue had, however, been more than counterbalanced by a reduction in expenditure amounting to about £10,000, which was due to the more favourable terms on which they had purchased fuel, to a considerable extent to economies effected in the consumption of coal, and to a material reduction in standing charges—rents and taxes and general administration expenses. While the capital account had increased by £168,000, the increase was being carefully watched. They had provided during the year, as a contribu-

SAWER & PURVES,

THE PIONEERS OF THE SLOT METER.

FIRST IN 1889.

THE INTRODUCTION OF THE SLOT METER.

WRITING to supplement the information given in our "Questions and Answers" column last week with regard to the introduction of the slot meter, a correspondent says that the first patentee was Mr. W. Brownhill, but his meter was never in practical use. The first Gas Company to supply gas in quantity through slot meters was the Liverpool United Gas Company. They supplied gas in bulk to the Corporation for the artisans' dwellings in Casino Street, Liverpool. The Corporation fixed 50 penny-in-the-slot meters in these dwellings. The meters were Thorp and Marsh's patent, and they were manufactured by Messrs. Sawer and Purves. The meters were fixed for six months on approval, at the end of which time the Corporation had to decide whether they were a success or failure. Mr. Marsh entered into a guarantee that the meters should be satisfactory, and he undertook liability for any accident that might occur. Our correspondent adds that he has no hesitation in saying that Sir George Livesey was the first man controlling a gas undertaking to strenuously advocate the use of the slot meter.

GAS v. ELECTRICITY

(From the GAS WORLD.)

FOREMOST 1909.

Scotch Agent: JNO. D. GIBSON, 93, Hope Street,

MILES PLATTING, RADFORD ROAD,

MANCHESTER, GLASGOW, NOTTINGHAM.

tion to the sinking fund, £36,308; and had written off for depreciation £53,259—in all £89,567, or about 5 per cent. of the net capital expenditure. As an indication of the progress of the department, and as showing that they had broadened the basis of their business, he mentioned that they had added 1232 new consumers (an increase of 7½ per cent.), 439 of whom were power consumers, representing in the aggregate 5757 H.P., which meant the closing down of some forty to fifty boilers and chimneys, and showed that the department was a valuable auxiliary to the Health Department of the city in their effort to purify the atmosphere.

In the subsequent remarks made by members, Mr. Cosh said he could not understand how a report could be considered satisfactory which revealed the fact that out of 32 million units sold, 22 millions (or two-thirds of the whole) were sold at less than cost price. According to the report, electricity cost 1¾d. to produce, and 22 million units were sold at 1⅓d. per unit. The result was that the parties who took the remaining one-third had to make up the deficiency on the two thirds, and were overcharged in consequence. He did not think that shopkeepers had been fairly treated by the department. Out of curiosity, he had made a note of his electricity accounts, with the following result: In 1905 his amount was (say) £100. In that year the charge was 6d. per unit up to 360 hours of maximum demand, after which the charge was 1d. per unit. At that time, he generally reached the reduced rate about the middle of December; and from then till June he had current at 1d. per unit. But the hours for the maximum demand were increased to 740, which increased his account by 30 per cent. Then he reintroduced gas, with inverted mantles; and during the last three years his average account had been 25 per cent. less than it was in 1905. Shopkeepers used a good deal of electricity—not for lighting but for advertisement purposes; and he thought they were entitled to some consideration on that account. Mr. P. G. Stewart protested against the ratepayers paying for Mr. Cosh's, or anybody else's, advertisement. He quite admitted, however, that there was a grievance, and trusted that the Committee would be able to give shorter prices to shopkeepers. Mr. W. T. Anderson considered that it was too bad that the average consumer should be compelled to burn more than 700 hours before he secured the reduced rate. The Corporation made £119,000 off this class; and he thought their claims ought to be considered. The accounts were adopted.

Death through Inhaling Coal Gas.—An unidentified visitor to Ramsgate was recently suffocated by gas in the bedroom of a lodging-house. The room was full of gas, and close to deceased's mouth was a rubber tube connected with the gas-jet; the keyhole and other means of ventilation having been carefully stopped up. Deceased had been at the house for the previous two nights. On the dressing-table was found a cutting from a newspaper reporting the suicide of a man, but no document that would serve as a clue to identity. At the inquest last Wednesday, a verdict of "Death through inhaling coal gas, there being no evidence to show the state of deceased's mind," was returned.

CURRENT SALES OF GAS PRODUCTS.

Sulphate of Ammonia. LIVERPOOL, *Aug.* 21.

The necessity for covering contracts for August shipment has occasioned good demand, and everything offered has readily been placed; the closing prices being £11 2s. 6d. per ton f.o.b. Hull, £11 3s. 9d. per ton f.o.b. Liverpool, and £11 5s. per ton f.o.b. Leith. There has also been good inquiry for delivery up to the end of the year, and a premium of about 2s. 6d. per ton has been obtainable. For delivery over the spring months, £11 10s. per ton has been paid, f.o.b. best ports; and this is the closing value.

Nitrate of Soda.

The market has been quiet, and the quotations remain 9s. 6d. per cwt. for 95 per cent., and 9s. 9d. for refined quality.

Tar Products. LONDON, *Aug.* 23.

There is little business doing in tar products, but prices are fairly well maintained all round. Pitch is very firm indeed, with an improving tendency; and were it not for the fact that some dealers on the Continent are accepting prices under the parity of English figures, it would be very much easier to do business in that quarter. In South Wales, the consumers are fairly well bought for near delivery, and appear disposed to wait before purchasing any further quantity. Probably they are anxious to secure some of their fuel contracts before buying pitch. Creosote is quiet, and orders are difficult to obtain. At the same time, it is well known that there are numerous inquiries to come from America, which is considerably assisting the market. Benzol, 90 per cent., is steady, but unchanged in price. There is a fair demand for 50-90 per cent. benzol, but at present buyers will not pay the prices asked by the makers. Toluol is in fair demand, and has been sold at a good figure in London. Solvent naphtha is firm in London, but is not in very good demand in the North. Carbolic acid is very weak, and business has been reported at 10½d. on the east coast. Naphthalene and creosote salts are steady, and the prices are unchanged.

The average values during the week were: Tar, 16s. to 20s., *ex* works. Pitch, London, 29s. 6d. to 30s.; east coast, 29s. 3d. to 29s. 6d.; west coast, 28s. 6d. to 29s. 6d. Mersey ports, 28s. 3d. to 28s. 9d. other ports. Benzol, 90 per cent., casks included, London, 6½d. to 6¾d.; North, 5¾d.; 50-90 per cent., casks included, London, 7d. to 7¼d.; North, 6¼d. to 6½d. Toluol, casks included, London, 8½d. to 9d.; North, 8d. to 8½d. Crude naphtha, in bulk, London, 3¼d. to 3½d.; North, 3d. to 3⅛d.; solvent naphtha, casks included, London, 10¾d. to 11⅛d.; North, 9¾d. to 10d.; heavy naphtha, casks included, London, 10⅛d. to 10¾d.; North, 9¼d. to 9¾d. Creosote, in bulk, London, 2⅞d. to 2 15/16d.; North, 2¼d. to 2⅜d. Heavy oils, in bulk, 2⅝d. to 2 15/16d. Carbolic acid, 60 per cent., casks included, east coast, 10⅛d. to 10⅜d.; west coast, 10¼d. to 10½d. Naphthalene, £4 10s. to £8 10s.; salts, 35s. to 37s. 6d.,

packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

This article is quiet, and there has been practically no change throughout the past week. The London Gas Companies still quote £11 7s. 6d.; but it is possible to buy outside makes upon Beckton terms at considerably under this figure. In Hull, business is reported to have been done at prices varying from £10 18s. 9d. to £11; while in Liverpool, £11 1s. 3d. to £11 2s. 6d. has been accepted. In Leith, £11 5s. is asked.

COAL TRADE REPORTS.

Northern Coal Trade.

There has been a decided ease in the coal trade, more especially in steam qualities. The price of best Northumbrian steams has fallen to about 11s. 3d. to 11s. 6d. per ton f.o.b. Second-class steams are weaker at about 10s. 6d., and steam smalls are from 5s. to 6s. The fall in price is attributed to the fact that before the settlement of the labour dispute consumers laid in large stocks; and these are now being used up. The effect is less evident in the gas coal trade: for there is now the usual increase in the consumption which sets in with the autumn, and causes enhanced demand both for home use and export. Durham gas coal is quoted for the usual classes from 10s. to 11s. 3d. per ton f.o.b.; "Wear specials" being up to 11s. 6d. The shipments of gas coals are heavy at the present time. The Italian ports seem to be buying freely, and that at prices that are somewhat near those current in the market. As these current prices are often from 1s. to 1s. 3d. per ton above the values contracted for in the first few months of this year, and there is no great change in the cost of production, the sales are an improvement to the producers. Coke is firm. Gas coke is steady, with a larger output, at 12s. 9d. to 13s. per ton f.o.b. for good quality.

Scotch Coal Trade.

Orders for home consumption are exceedingly scarce—manufacturers being still engaged in working off the stocks of coal which they accumulated under fear of a strike. The prices now quoted are: Ell 9s. 6d. to 10s. 6d., splint 10s. 3d. to 10s. 6d., and steam 9s. 3d. to 9s. 6d. per ton f.o.b. Glasgow. The shipments for the week amounted to 319,094 tons—an increase of 15,488 tons upon the preceding week, but a decrease of 26,390 tons upon the corresponding week of last year. For the year to date, the shipments have been 9,101,467 tons—an increase of 507,297 tons upon the corresponding period.

Proposed National Federation of Coalowners.

According to the "Iron and Coal Trades Review," private meetings of coalowners are being held in South Wales in connection with the formation of a National Federation of Coalowners. Our contemporary says: "In view of the recent wage crisis in the coal trade and ominous rumours of continued unrest and dissatisfaction among the miners in various parts of the country, special interest attaches to the progress of the movement for the formation of a National Federation of British colliery owners. The scheme was first considered at an informal meeting in London of members of the Mining Association of Great Britain, at the close of which it was agreed to put the proposal before the various local Associations. We understand it has been received sympathetically. The recent action of the Miners' Federation of Great Britain in recklessly and quite unnecessarily threatening the country with a national strike emphasizes the need of some settled understanding among employers in the coal industry. No doubt there are difficulties to be overcome in arriving at a general agreement. Troubles in one coalfield often constitute the opportunity of another; but, after all, such advantages are of a temporary character, and permanently favour no particular part of the country, since the miners are restive now in one district and then in another, so that it should be by no means impossible to draw up terms upon which the colliery proprietors of the country would undertake to sacrifice such ephemeral and doubtful benefits for those of a more solid and lasting character likely to result from an alliance of a kind which should at least enable them to present a united front financially to the Trade Unions should further occasion arise. Even if its scope were limited to this purpose only, the game would be well worth the candle."

The Lighting of Blackfriars Bridge.—The widened Blackfriars Bridge is to be lighted with inverted mantles and high-pressure gas, similar to those with which the Franco-British Exhibition was partly illuminated last year. The South Metropolitan Gas Company have the matter in hand; and when everything is complete the bridge will probably be the best-lighted one in London.

Electricity Supply in Manchester.—The following was the first of the "Electrical Notes" in the Engineering Supplement to "The Times" last Wednesday: "With 352 miles of mains and a year's sale of 67 million units, Manchester easily maintains its eminence as the most important of our municipal supply undertakings. An examination of the detailed accounts for the year ended March 31, 1909, does not, however, afford unalloyed satisfaction. The load-factor has gone down slightly, from 25·39 to 24·6 per cent.; and the revenue from light and power is diminished by over £6000. Although in this case it is fair to couple this fact with the reduction in price of current, yet such a reduction in charges is made surely as a commercial expedient for enhancing the total receipts. Manchester is evidently feeling the effect of metal filament lighting and of a check to the progress of power consumption. At the same time, the undertaking has a great future to explore, in respect of both light and power expansion; and the tendency is always favourable to reduced costs. The city's ownership of the gas-works is probably responsible for the small amount of public electric lighting, accounting for rather less than 100,000 of the 67,000,000 units sold." We agree with a correspondent who called attention to this paragraph, that the last sentence is a "candid admission."

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The Proposed New Gas-Works for Belfast.

At a meeting of the Gas Committee of the Belfast Corporation on Monday last week, the City Surveyor (Mr. H. A. Cutler) submitted comparative estimates in regard to six suggested sites for the proposed new gas-works—Ormeau Park, Ormeau Park and Glentoran, Donegall Road, Cranmore, Twin Island, and Brick-Works. The first estimate gave the value of each site to the surface level, with the capitalized value of the cost of the carriage of coal for thirty years; while the second, as suggested by the Sub-Committee, gave the value of each site to the surface level with the total expenditure on coal conveyance in thirty years. After some discussion, it was resolved to hold a special meeting of the Committee for the purpose of finally considering the matter and arriving at a conclusion. The special meeting was held last Thursday, when the Gas Engineer and Manager (Mr. Robert Sharpe) submitted a report on the following points regarding the sites: (1) The area needed for the extension; (2) the character of the sites; and (3) their relative values. It was decided that the report should be printed and forwarded to each member of the Committee, together with the report of the Tramways and Electricity Committee, when received, relative to the cost of the haulage of coal over their system. It was also resolved that the members of the Committee be furnished with copies of any reports presented to the Sites Sub-Committee since Sir Alexander Binnie sent in his report on the respective sites.

Assessment of Whitby Gas-Works Reduced.—The Directors of the Whitby Gas Company have been successful in their appeal against the assessment of their undertaking; the rateable value having been thereby reduced from £1229 to £685. The Company were represented by Mr. George Buchannan (Messrs. Buchannan and Sons, Solicitors), and the Secretary of the Company, Mr. W. M. Galleway.

Gas-Works Extensions at Haverhill.—At the last meeting of the Haverhill Urban District Council, the Gas Committee reported that a letter had been received from the Local Government Board giving their sanction to the Council borrowing £1000 for extensions at the gas-works for a period not exceeding twenty years. Tenders were received from Messrs. Winstanley and Co., of King's Norton, for building a new retort-bench and new retort-house roof in accordance with specification and plans submitted, for £878 and £97 respectively; and the Committee recommended that their tenders should be accepted. This was agreed to.

Rawcliffe Gas and Coke Company, Limited.—Mr. Justice Hamilton, sitting as Vacation Judge, had before him last Wednesday a motion in a debenture-holders' action for the appointment of a receiver and manager for the above-named Company. Counsel for the plaintiffs (the Water-Works, Lighting, and Power Investment Corporation, Limited) stated that the defendant Company appeared, and, subject to his Lordship's approval, were prepared to treat the motion as the trial of the action. His Lordship appointed the gentleman named in the notice of motion to be receiver and manager, but not to act as receiver for more than three months without leave of the Court; and he made the usual decree directing accounts and inquiries.

Salford Corporation's Decreased Revenue.—From a report prepared by the Borough Treasurer of Salford, the net deficiency on the several accounts for the financial year 1908-9 was £16,195. The net gas profits of £20,048 show a decrease of £5211 compared with the previous year; the electricity profits totalled £6500, or £1500 less; and the water profits were £247, or £2171 less, attributed to decreased sales to manufacturers. The balance of assets and capital outlay over liabilities increased during the year by £72,893; and the total balance on March 31 last was £1,523,215. At the same date the mortgage debt of the borough was £3,730,476—a decrease of £17,043 on the year. During the twelve months there were fresh borrowings amounting in all to £101,050; and at the close the net mortgage debt stood at £3,475,471.

Gas Supersedes Electricity for Lighting the Brighton Railway Station.—We learn from the "Sussex Daily News" that the London and Brighton Railway Company have decided to adopt gas for the lighting of the station and the various workshops at Brighton, in place of electric light; and that they have given the contract to the Brighton and Hove Gas Company, who will commence the work forthwith. This is a decided "score" for the Company, as exceptionally favourable terms were offered for the supply of electricity by the Corporation. The system to be installed is the most up-to-date high-pressure one; and when completed the station is expected to be one of the best lighted in the country. At the same time a considerable saving in cost is anticipated. The installations will be carried out by the James Keith and Blackman Company, Limited.

Lighting of Keady (Co. Armagh).—Last Thursday, Mr. A. D. Price, one of the Inspectors of the Local Government Board for Ireland, held an inquiry into an application made by the Urban District Council of Keady for a loan of £2000 for erecting new gas-works and plant. The Clerk (Mr. Peter M'Knight) stated that the Council had purchased the gas-works from the Keady Gas Company at 3s. 9d. per 20s. share, and the capital of the Company was £700. They thought they had made a good bargain. They had acquired a site for the new works for £100. The town was progressing, as the census showed the population for 1901 to be 1468 and now 1550. The average annual cost for lighting the town for the last four years was £42. Mr. James Whimster, of Armagh, said he had drawn the plans and specifications for the Council, and estimated the cost of the erection of the works at £2479. The net profit in a few years should work out at £126 per annum; the charge for gas to be 5s. 5d. per 1000 cubic feet. The Chairman of the Council (Mr. G. M'Bride) said the town was growing in prosperity, and a good supply of gas was urgently needed. Half the town had to be lighted by oil. A new bakery was in course of construction, and it had been arranged to instal a 17½ H.P. gas-engine. The present works had been over sixty years in existence, and were simply useless to supply the town. There were only 34 inhabitants who had gas laid on, and there were 455 houses which would have it if a proper supply were given. The present price was 7s. per 1000 cubic feet. There was no opposition to the application.

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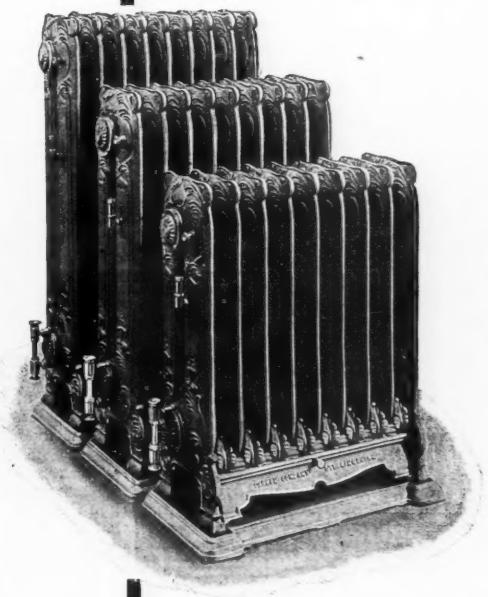

SHOW-ROOMS:—LONDON (City)—15, Upper Thames St., E.C.; (West End)—23, Princes St., Cavendish Sq., W.; LIVERPOOL—22 to 30, Red Cross St.; GLASGOW—125, Buchanan St.; MANCHESTER—24, Brazennose St.; BRISTOL—6, Victoria St.; NEWCASTLE-ON-TYNE—13, Prudhoe St.; BIRMINGHAM—218, 220, 222, Corporation St.; DUBLIN—44, Grafton St.

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A "Slump" in Electricity.—"Electrical Industries" says: "The problem which is facing us to-day concerns methods to be adopted in order to induce the public to use an increased quantity of electricity in suitable auxiliary apparatus, and thus at least to maintain quarterly bills at their old level, or, better still, to show a healthy financial increase."

Water-Works for Liss.—The Rural District Council at Petersfield have received a report in regard to the completion of the water-works for Liss. The total cost has been £7716; and as a further loan is required, the Local Government Board are to be asked to authorize the borrowing of £700, while the remaining £16 is to be paid out of the current rate.

Water Supply in the Camborne District.—There have lately been serious complaints by the residents at Beacon and Illogan Highway in regard to the water supply, which is in the hands of the Camborne Water Company. The Directors have for some time had the matter under consideration; and with the view of improving the service, they have embarked on an expenditure of £10,000.

"Marcus" Coke Screen-Conveyors for Croydon.—Messrs. Head, Wrightson, and Co., Limited, have received an order for two "Marcus" coke screen-conveyors for the Croydon Gas-Works. Each screen is 3 ft. 6 in. wide and 63 feet long, and is capable of dealing with 30 tons of coke per hour. This is the first installation of this screen-conveyor received for gas-works; but its value for conveying and classifying coal and coke has been demonstrated in many installations connected with coke-ovens and colliery plants.

Early Days of Gas Lighting at Taunton.—In connection with the notice of the annual general meeting of the Taunton Gas Company which appears elsewhere, it may not be without interest to reproduce from the "Correspondents' Replies to Queries" in the "Somerset County Herald" for the 14th inst. the following particulars in regard to the original Company: "A good many dates in the history of Taunton can be fixed by the journals of the House of Commons. On Feb. 12, 1845, a petition was read from the inhabitants of the town and neighbourhood for leave to bring in a Bill for better supplying Taunton with gas. On the 3rd of March, the Market Trustees sent up a petition praying that the Taunton Gas Bill might not pass into law. On the 17th of April, shareholders in the Taunton Gaslight Company prayed to be heard against parts of the Taunton Gas Bill. On the 30th of June, the Bill was passed. This was the only Taunton Gas Bill introduced into the House of Commons. No doubt the Taunton Gaslight Company which protested against the Taunton Gas Bill of 1845 was formed under powers possessed by the Market Trustees for cleansing and lighting the streets. During the first part of the reign of George III., the only Lighting Bills were those to enable the inhabitants of specified districts to light and watch the streets during certain hours of the night."

Rural Water Supplies in Devonshire.—Inquiries were held last week by Mr. E. A. Sandford Fawcett respecting applications by the Tavistock Rural District Council for the Local Government Board's sanction to loans for works of water supply for the parishes of Peter Tavy and Mary Tavy, on the borders of Dartmoor. In both cases the population is small, and the sums proposed to be borrowed were £260 for the former and £1660 for the latter place. Opposition was offered to the expenditure of money at Peter Tavy, on the ground that it is unnecessary; there being an abundant supply of water at the public wells. The Inspector asked if it would not be convenient to people to have taps near their own houses; to which the spokesman for the opposition replied that he thought they would rather go to the wells. In the case of Mary Tavy, Mr. H. F. Bellamy produced plans of a scheme including a reservoir to hold 45,000 gallons, and afford a daily supply of 10 gallons per head. A number of ratepayers offered opposition to the scheme, chiefly on the ground that they would not directly benefit by it, though they would have to pay a large proportion of the cost. The Inspector said it was useless to contend that the water supply was not necessary, for the Local Government Board had for years been pressing for a scheme to be carried out. The opponents of the project replied that they considered that those who were to benefit by it should bear the cost, and that instead of a general rate over the whole parish the cost should be met by a special water-rate paid by the consumers. It was also suggested as an alternative to the present proposals that the District Council should enter into an arrangement with the War Office to supply water for the parish from the Government reservoir in the district.

Suicides by Coal Gas.—At a new shop in Oxford Road, Reading, a man's dead body was found under circumstances which pointed to suicide. He was lying on the floor of the scullery, all the windows and doors of which had been closed and the gas turned on; the result being that he was asphyxiated. The unfortunate man had previously attempted to take his life in a similar way at Merthyr. A sad case of suicide was investigated at the Westminster Coroner's Court on Friday. The inquiry had reference to John Volkes-Cooper, aged 47, a brewer's drayman, of South-East Block, Peabody Buildings, Buckingham Gate. The widow stated that deceased had complained of the heat and pains in his head; he had never threatened his life. On the previous Monday morning witness went to work, and upon returning at midday found the doors of their rooms locked and the windows closed, which was very unusual. Entering the bedroom, she found it full of gas, and noticed that the gas-burner had been removed, and that the tap was full on. Her husband was lying on the bed partly dressed, and she saw no sign of life. He had met with several accidents. The Coroner's officer stated that he had made inquiries at Messrs. Meux's brewery, and ascertained that the deceased had been discharged. Dr. Trevor, who made a post-mortem examination, stated that death was due to coal gas poisoning. Deceased had sustained injuries to his head, which might have given rise to irritability. The Jury returned a verdict of "Suicide during temporary insanity." An inquest was recently held at Lewisham on the body of Francis Henry Darker, an optician, who was found dead in his workshop, which was full of gas. The burner over the bench had been removed, and an india-rubber tube attached, the end of which was in deceased's mouth. A verdict of "Suicide while of unsound mind" was returned.

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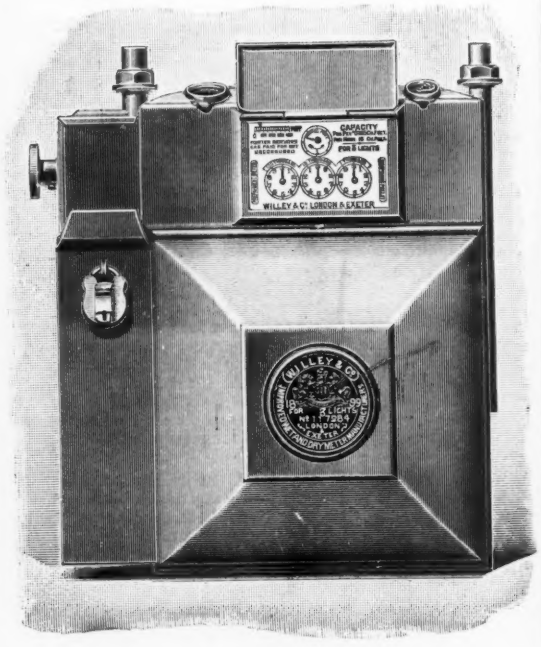

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AGENTS FOR SCOTLAND:

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The Directors of Crossley Bros., Limited, Manchester, recommend an interim dividend on the ordinary shares of 2 per cent. (actual), against 2½ per cent. for the first half of 1908.

By a ailure of the electric light at King's Lynn, Norfolk, last Saturday night, large parts of the town were in complete darkness, while shops were lit by candles and stable lanterns.

The Local Government Board have sanctioned the raising of loans for £6400 for gas-mains and £3200 for meters, repayable in thirty and ten years respectively, by the Mansfield Corporation.

The gas authorities of Hamburg have placed a repeat order with the Ofenbau Gesellschaft of Munich for Munich chambers to produce 3,800,000 cubic feet of gas per diem. The new plant will be erected at the Grasbrook works at Hamburg; and it will bring up their chamber carbonizing plant to 500 tons of coal per 24 hours.

The construction of the subways in connection with the widening of Blackfriars Bridge has cost about £10,000; while the alteration to the electricity, gas, and water mains in the streets and in the pipe subway of the London County Council has entailed the expenditure of another £20,000. The total length of the two subways will be 500 feet; and they are now nearing completion.

The premises of the Edinburgh and Leith Gas Commissioners in New Street, Edinburgh, have now been closed; and notices have been issued that the new address of the Chief Engineer and Manager (Mr. W. R. Herring) is Calton Hill, Edinburgh, the administration of all the departments of the undertaking being now concentrated within buildings situated at Calton Hill, immediately at the back of the general offices in Waterloo Place.

APPLICATIONS FOR LETTERS PATENT.

18,302.—Midgley, J. A., "Gas-engines." Aug. 9.

18,334.—Noad, J., "Distilling shale and other bituminous substances." Aug. 9.

18,380.—Wright, E. T., and Skidmore-Westwood, W. W., "Gas valve-operating mechanism." Aug. 10.

18,413.—Jones, A. O., "Quenching coked products." Aug. 10.

18,435.—Edwards, A. N., "Controlling a conduit for gas." Aug. 10.

18,455.—Parker, C. H., "Dip-pipes." Aug. 10.

18,487.—Green, H. R., "Taps and valves." Aug. 11.

18,490.—Prockter, F. M., "Joining the ends of pipes or tubes or attaching such pipes or tubes to other apparatus." Aug. 11.

18,492.—Koenig, J., "Flexible pipe connections." Aug. 11.

18,493.—Koenig, J., "Pipe connections." Aug. 11.

18,516.—Felchlin, A., "Acetylene gas-burner." Aug. 11.

18,591.—Giorgi, A., "Inverted incandescence gas-lamps." Aug. 12.

18,593.—Izod, H. W., "Manufacture of ozonized and (or) oxygenated carburetted vapour or gas." Aug. 12.

18,656.—Chandler, S. & J., "Grids for gas-purifiers." Aug. 13.

18,679-80.—Dier, F. F., and Primeau, M., "Gas-lighting appliances." Aug. 13.

18,683.—Chipperfield, W. H., "Intermittent supply of gas to burners, particularly applicable to advertising purposes." Aug. 13.

18,761.—Norman Dickin and Cook Gas Engineering Company, Limited, "Regenerative gas-burner for use with incandescent mantles." Aug. 14.

18,764.—Humphrey, A. A., "Carburetting air." Aug. 14.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

Engineer, Works' Manager, and Draughtsman. Hapgoods, Limited.
Visiting Teacher of Advanced Gas Supply. London County Council.
Working Manager. Coleshill Gas Company.
Traveller. No. 5127.

Pupil Required.

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Meetings.

Harrow and Stanmore Gas Company. Holborn Restaurant, Sept. 6, Twelve o'clock.

Spent Oxide.

Seaford Gas Company.

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Cookers, Heating Stoves, &c.

Belfast Corporation. Tenders by Sept. 9.

General Stores (Iron and Steel Cocks, Shovels, Waste, Gaskin, Oil, Brooms, Lime, Glass, &c., &c.).

Bradford Gas Department. Tenders by Sept. 16.

Lamps, Burners, Fittings, &c.

Belfast Corporation. Tenders by Sept. 9.
Bradford Gas Department. Tenders by Sept. 16.
Fulbourn Asylum, Cambridge. Tenders by Aug. 28.

Meters, &c.

Belfast Corporation. Tenders by Sept. 9.
Bradford Gas Department. Tenders by Sept. 16.

Pipes, &c.

Bradford Gas Department. Tenders by Sept. 16.
Fulbourn Asylum, Cambridge. Tenders by Aug. 28.

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THE SCIENCE AND PRACTICE OF LIGHTING AS APPLIED TO STREETS, OPEN SPACES, AND INTERIORS.—By W. H. Y. Webber. *Price* 3*s.* 6*d.*

THE VALUATION OF GAS, ELECTRICITY, AND WATER-WORKS FOR ASSESSMENT PURPOSES.—Second Edition. By Thomas Newbigging, M.Inst.C.E., and William Newbigging, Assoc.M.Inst.C.E. *Price* 5*s.*

REESON'S COMPLETE GAS AND WATER ACTS.—By Joseph Reeson. *Price* 21*s.*

PUBLIC LIGHTING BY GAS AND ELECTRICITY.—By W. J. Dibdin, F.I.C., F.C.S. *Price* 21*s.*

CONSTRUCTION OF GAS-WORKS.—By Hughes and O'Connor. *Price* 6*s.*

NOTES ON THE LITHOLOGY OF GAS COALS. WITH LIST OF COMMERCIAL ANALYSES.—By James Paterson, C.E., F.G.S. *Price* 3*s.*

MOND GAS SCHEME.—By F. N. Keen, of the Middle Temple, Barrister-at-Law. *Price* 1*s.*

GAS, OIL, AND AIR ENGINES. — By (the late) Bryan Donkin. *Price* 25*s.*

THE FLOW OF GASES AND PROPORTIONING GAS-MAINS. — By F. Southwell Crapps, Assoc. M.Inst.C.E. *Price* 7*s.* 6*d.*

GAS AND FUEL ANALYSIS.—By A. H. Gill. *Price* 5*s.* 6*d.*

SANDELL'S GAS COMPANIES' EXPENDITURE JOURNAL.—*Price, two quires,* 36*s.*; *three quires,* 45*s.*

INTERNATIONAL ENGINEERING CONGRESS (GLASGOW, 1901)—THE PROCEEDINGS OF THE GAS SECTION. Edited by J. W. Helps, M.Inst.C.E. *Price* 5*s.*

GAS-WORKS DIRECTORY AND STATISTICS, 1907-8. *Price* 10*s.* 6*d.*

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COUNTY OF LONDON.

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Applications should be made on Form T. 17, to be obtained from the Education Officer, London County Council Education Offices, Victoria Embankment, W.C., to whom they must be returned not later than Eleven a.m. on the 11th of September, 1909, accompanied by *copies* of Three Testimonials of recent date.
All communications on the subject must be endorsed "T. 1.," and a stamped addressed foolscap envelope must be enclosed.
Canvassing, either directly or indirectly, will be held to be a disqualification for employment.
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L.C.C. Education Offices,
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(GAS AND WATER DEPARTMENT.)

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THE above Council invite Tenders for the Purchase of the whole or part of their Surplus GAS COKE, estimated at 3500 to 4000 Tons, for the Twelve Months ending the 31st day of August, 1910.
Specification and Form of Tender may be obtained on Application to Mr. Octavius Thomas, Engineer and Manager, Gas and Water Offices, Pentre, Rhondda.
Tenders to be sent in not later than Ten a.m. on Thursday, Sept. 2, addressed to the Chairman of the Gas and Water Committee, endorsed "Tender for Gas Coke."
The Council do not bind themselves to accept the highest or any Tender.
WALTER P. NICHOLAS,
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(GAS DEPARTMENT.)

TENDERS are invited for the Supply of GAS COOKERS, HEATING STOVES, FITTINGS, and other APPLIANCES for One Year from Oct. 1, 1909.
All Goods must be delivered free into the Corporation Stove Warehouse, and Empties will be returned Carriage forward.
Tenders, endorsed "Tender for Gas Appliances," will be received by the Town Clerk, City Hall, not later than the 9th of September, 1909.
The lowest or any Tender not necessarily accepted.
ROBERT SHARPE,
Engineer and Manager.
Gas-Works, Belfast.

CITY AND COUNTY BOROUGH OF BELFAST.
(GAS DEPARTMENT.)

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ROBERT SHARPE,
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Best Engine Oil, 1500 gallons.
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Tarred Gaskin, 90 cwt.
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Lamp Irons, 300.
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Form of Tender, with any further Information required, may be had on Application to Mr. Chas. Wood, Gas Engineer, Town Hall, and Samples may be seen at Mill Street Gas-Works.
The Contracts will be let subject to the Fair Contracts Clauses of the Corporation, which may be seen at the Town Clerk's Office, and which the accepted Contractors will be required to sign.
Tenders, endorsed "Tender for Stores," to be sent to me not later than Thursday, Sept. 16.
The lowest or any Tender will not necessarily be accepted.
FREDERICK STEVENS,
Town Clerk.
Town Hall, Bradford,
Aug. 16, 1909.

THE Proprietor of the Patents No. 7188 of 1901, for "IMPROVEMENTS IN OR RELATING TO ACETYLENE GAS-LAMPS or GENERATORS;" No. 11,612 of 1902, for "ACETYLENE GAS-LAMP for TABLE USE; No. 23,629 of 1903, for "IMPROVEMENTS IN ACETYLENE GAS-GENERATORS;" No. 10,185 of 1905, for "IMPROVEMENTS IN ACETYLENE GAS-GENERATORS" is desirous of entering into Arrangements, by way of LICENCE and Otherwise, on Reasonable Terms, for the purpose of EXPLOITING the same and ensuring their Full Development and Practical Working in this Country.
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All Communications should be addressed in the first instance to HASELTINE, LAKE, AND CO., Chartered Patent Agents and Consulting Engineers, 7 & 8, Southampton Buildings, Chancery Lane, LONDON, W.C.

HARROW AND STANMORE GAS COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY MEETING of the Proprietors will be held at the Holborn Restaurant, 218, High Holborn, London, on Monday, the 6th day of September, 1909, at Twelve o'clock precisely, to receive the Directors' and Auditors' Reports; to declare a Dividend; and to transact any Ordinary Business of the Company.
The REGISTER OF TRANSFER BOOKS WILL BE CLOSED from Aug. 31 until Sept. 6, both inclusive.
AND NOTICE IS HEREBY GIVEN, that an EXTRA ORDINARY GENERAL MEETING of the above Company will be held at the Holborn Restaurant, 218, High Holborn, London, on Monday, the 6th day of September, 1909, immediately on the conclusion of the Business of the Ordinary General Meeting to be held on the same day, for the purpose of considering, and if deemed expedient passing, a resolution to authorize the Directors to issue a further £33,000 of Additional Capital and to borrow, by the creation of Debenture Stock, £11,000 in respect of such Additional Capital in pursuance of the Acts of Incorporation in such manner and at such times as they may determine.
By order of the Board,
J. L. CHAPMAN,
Secretary.
Gas Office, Roxeth, Harrow,
Aug. 17, 1909.

SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
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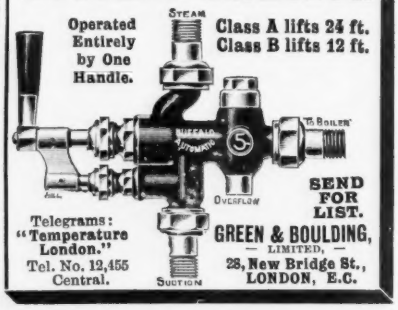

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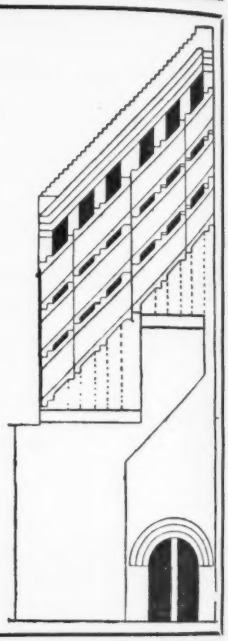

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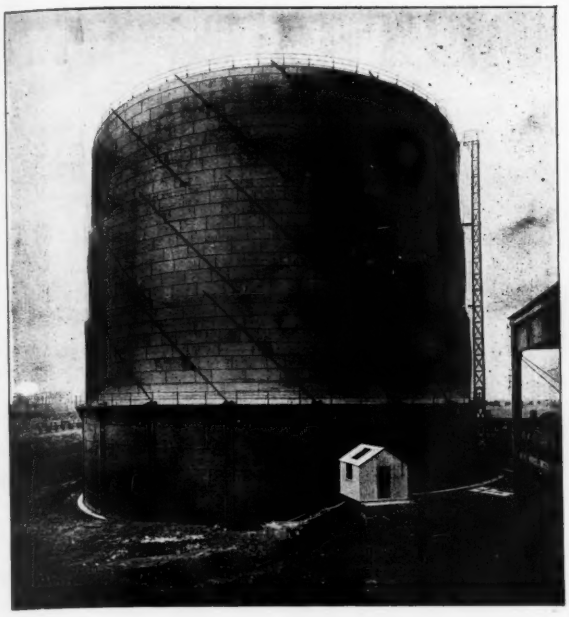

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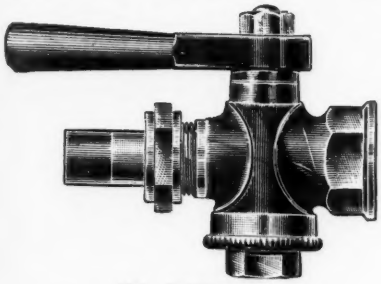
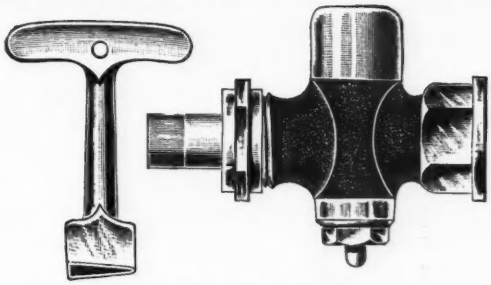


D1 PATTERN.



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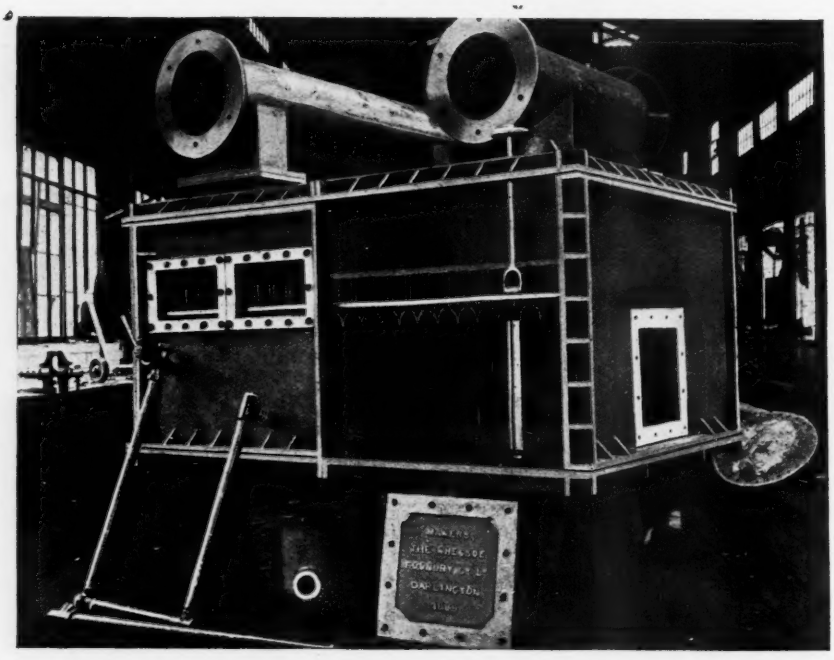

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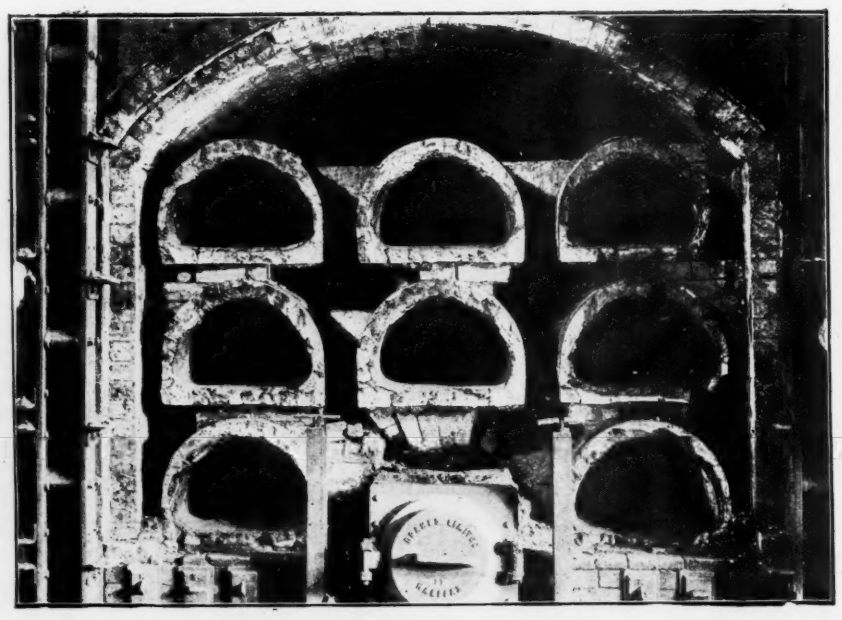

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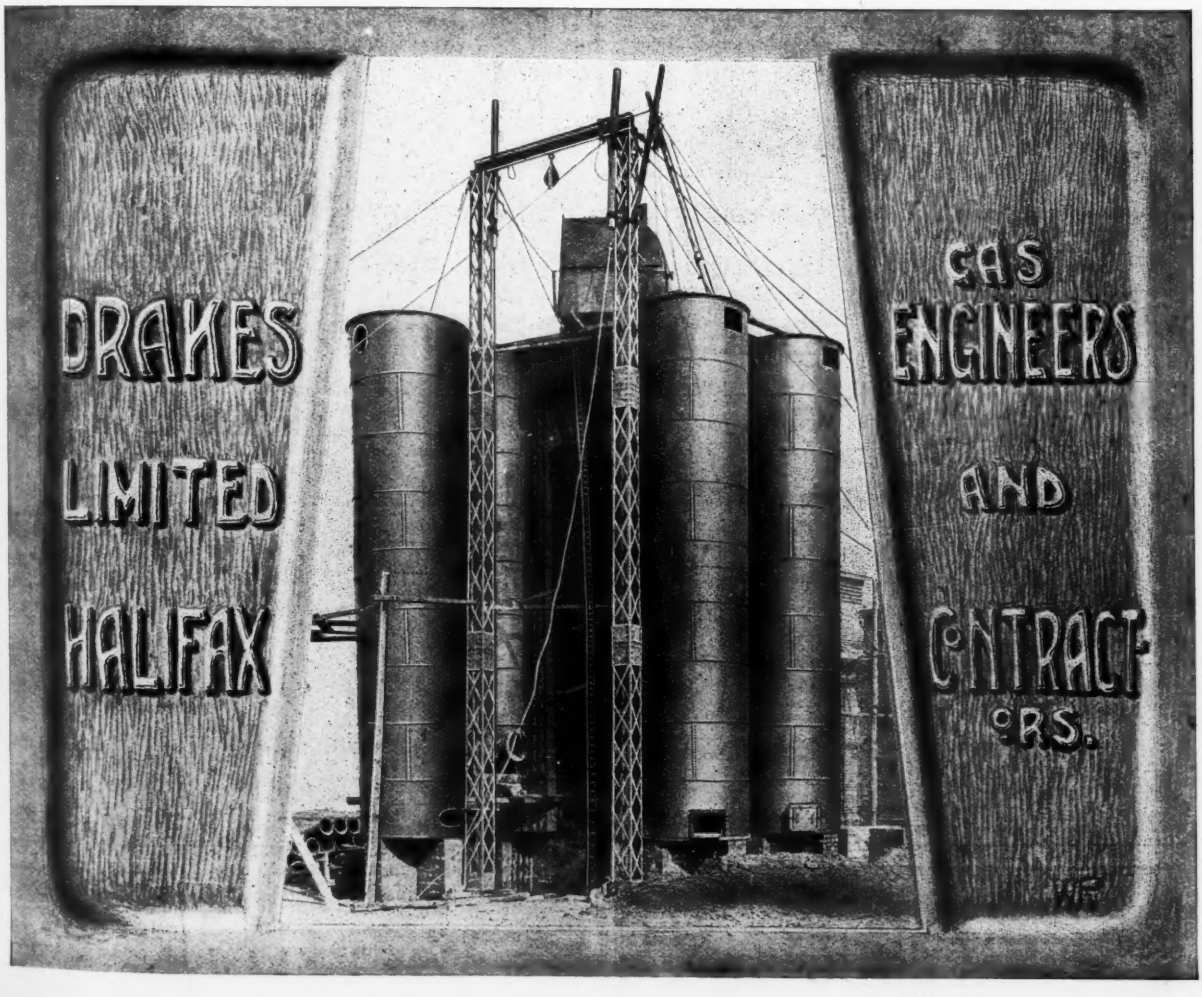

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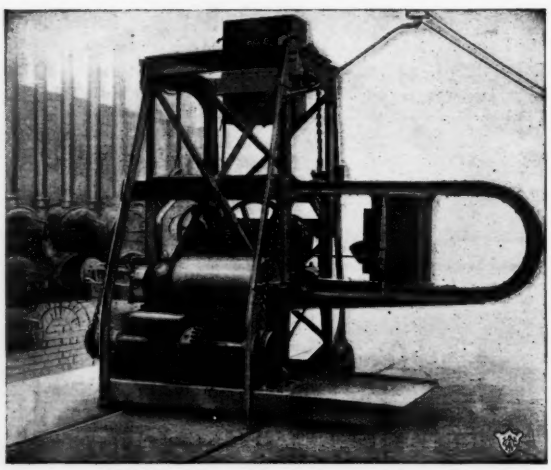

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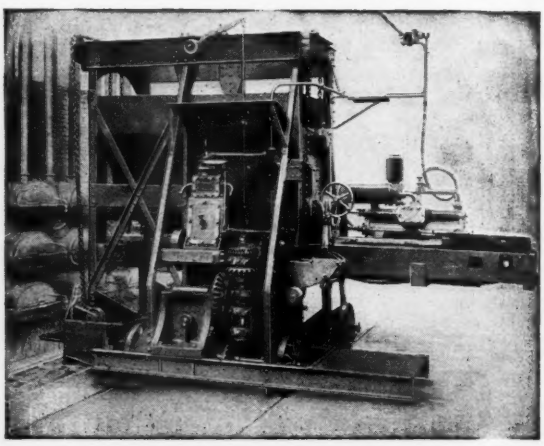

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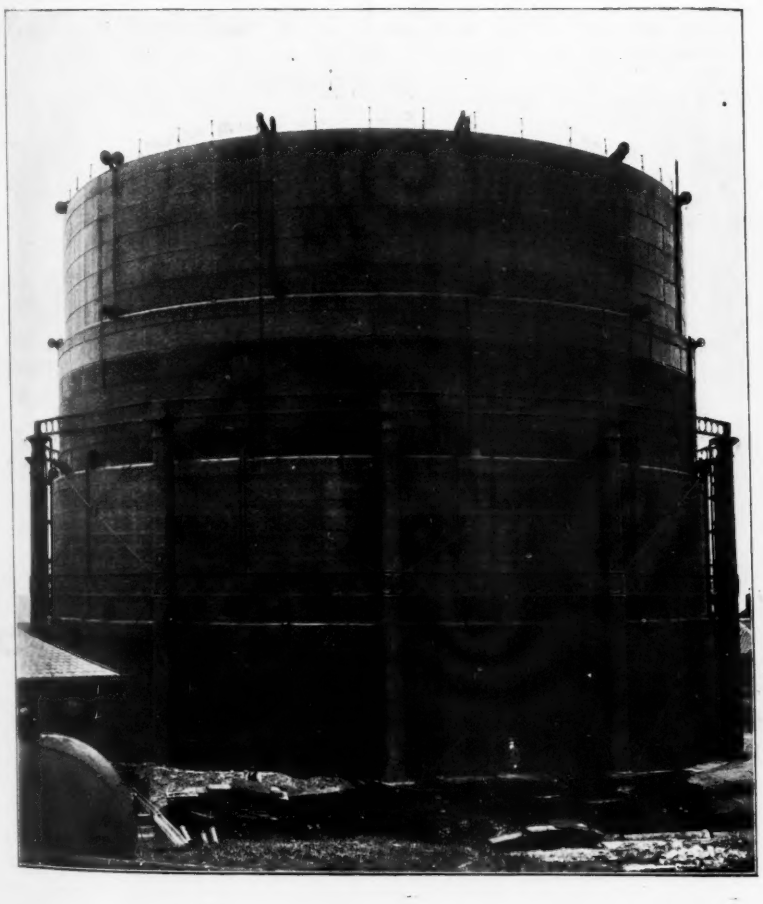

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